# Functional Requirement

1. Functional Requirements   
  
1.1 Email Creation Function   
Function ID: FR-01   
Description: An administrator can create a new email with subject, content, recipients (individual contacts or distribution groups), and choose an associated email account for sending.   
Input: Subject, body content, recipient list (contact IDs or distribution group IDs), selected email account ID, send/schedule option.   
Output: A new email record stored in the system (sent or saved as a draft).   
  
1.2 Email Sending Function   
Function ID: FR-02   
Description: An administrator can send an email to the selected recipients through the configured email server.   
Input: Email ID, selected email account ID, recipient list (contact IDs or distribution group IDs).   
Output: Sent email marked as "Sent" in the system and a recovery record created if retention policies are enabled.   
  
1.3 Email Receiving Function   
Function ID: FR-03   
Description: The system can receive incoming emails from the configured email server and store them in the appropriate inbox.   
Input: Email server configuration, incoming email content and metadata.   
Output: A new email record stored in the inbox of the associated email account.   
  
1.4 Email Viewing Function   
Function ID: FR-04   
Description: An administrator can view the content of a selected email, including subject, sender, recipient, body, and attachments.   
Input: Email ID.   
Output: Full email content and metadata displayed to the administrator.   
  
1.5 Email Archiving Function   
Function ID: FR-05   
Description: An administrator can move an email to the archive folder and apply a retention policy if configured.   
Input: Email ID, archive folder configuration, retention policy ID (optional).   
Output: Email marked as "Archived" and moved to the archive folder, with a recovery record created if applicable.   
  
1.6 Email Archive Search Function   
Function ID: FR-06   
Description: An administrator can search for archived emails using keywords, date range, sender, recipient, or associated email account.   
Input: Search criteria (keywords, date range, sender, recipient, account).   
Output: List of matching archived emails displayed to the administrator.   
  
1.7 Email Archive Management Function   
Function ID: FR-07   
Description: An administrator can perform actions such as restoring or deleting an archived email.   
Input: Email archive ID, action type (restore or delete).   
Output: Updated email status (e.g., restored to inbox or deleted), and a recovery record created if applicable.   
  
1.8 Calendar Creation Function   
Function ID: FR-08   
Description: An administrator can create a new calendar event with title, date, time, location, and optional email notifications to attendees.   
Input: Title, start and end times, location, attendee list (contact IDs or distribution group IDs), notification settings.   
Output: A new calendar event record stored in the system.   
  
1.9 Calendar View Function   
Function ID: FR-09   
Description: An administrator can view the details of a calendar event, including title, date, time, attendees, and description.   
Input: Calendar event ID.   
Output: Display of full event details to the administrator.   
  
1.10 Calendar Update Function   
Function ID: FR-10   
Description: An administrator can modify the details of an existing calendar event and optionally send updated notifications to attendees.   
Input: Calendar event ID, updated event details (title, date, time, location, attendees).   
Output: Updated calendar event record, with notifications sent if enabled, and a recovery record created if applicable.   
  
1.11 Calendar Event Deletion Function   
Function ID: FR-11   
Description: An administrator can delete a calendar event, with the option to send cancellation notifications to attendees.   
Input: Calendar event ID, confirmation for deletion, notification settings.   
Output: Deleted calendar event, with cancellation notifications sent if enabled, and a recovery record created if applicable.   
  
1.12 Contact Creation Function   
Function ID: FR-12   
Description: An administrator can create a new contact with name, email, phone number, and other relevant details.   
Input: Name, email address, phone number, address, and optional notes.   
Output: A new contact record stored in the system.   
  
1.13 Contact Viewing Function   
Function ID: FR-13   
Description: An administrator can view the details of a selected contact, including name, email, phone number, and any additional notes.   
Input: Contact ID.   
Output: Display of full contact details to the administrator.   
  
1.14 Contact Update Function   
Function ID: FR-14   
Description: An administrator can update the details of an existing contact, such as name, email, phone number, or address.   
Input: Contact ID, updated contact details.   
Output: Updated contact record stored in the system, with a recovery record created if applicable.   
  
1.15 Contact Deletion Function   
Function ID: FR-15   
Description: An administrator can delete a contact, updating any related records (e.g., distribution groups or calendar events) if needed.   
Input: Contact ID, confirmation for deletion.   
Output: Deleted contact record, with related references updated and a recovery record created if applicable.   
  
1.16 Distribution Group Creation Function   
Function ID: FR-16   
Description: An administrator can create a new distribution group with a name, description, and a list of contacts to include.   
Input: Group name, description, and selected contact IDs.   
Output: A new distribution group record stored in the system.   
  
1.17 Distribution Group Modification Function   
Function ID: FR-17   
Description: An administrator can add or remove contacts from a distribution group.   
Input: Distribution group ID, list of contacts to add or remove.   
Output: Updated distribution group record, with a recovery record created if applicable.   
  
1.18 Distribution Group Deletion Function   
Function ID: FR-18   
Description: An administrator can delete a distribution group, ensuring all associated email references are updated or removed.   
Input: Distribution group ID, confirmation for deletion.   
Output: Deleted distribution group record, with a recovery record created if applicable.   
  
1.19 Email Account Creation Function   
Function ID: FR-19   
Description: An administrator can create a new email account with username, password, and server configuration.   
Input: Username, password, server settings (e.g., IMAP/SMTP), account type.   
Output: A new email account record stored in the system.   
  
1.20 Email Account Deletion Function   
Function ID: FR-20   
Description: An administrator can delete an email account and process any associated emails or recovery records.   
Input: Email account ID, confirmation for deletion.   
Output: Deleted email account record, with associated data processed and a recovery record created if applicable.   
  
1.21 Email Account Management Function   
Function ID: FR-21   
Description: An administrator can update the configuration of an existing email account, including password, server settings, or account type.   
Input: Email account ID, updated configuration details.   
Output: Updated email account record and a recovery record created if applicable.   
  
1.22 User Account Creation Function   
Function ID: FR-22   
Description: An administrator can create a new user account with name, email, password, and role.   
Input: Name, email, password, role.   
Output: A new user account record stored in the system.   
  
1.23 User Account Management Function   
Function ID: FR-23   
Description: An administrator can update or delete a user account, updating related data (e.g., email accounts, calendars, contacts) as needed.   
Input: User ID, action type (update or delete), updated details (if updating).   
Output: Updated or deleted user account record, with a recovery record created if applicable.   
  
1.24 User Account Viewing Function   
Function ID: FR-24   
Description: An administrator can view the details of a user account, including name, role, associated email accounts, and access logs.   
Input: User ID.   
Output: Display of full user account details to the administrator.   
  
1.25 Retention Policy Creation Function   
Function ID: FR-25   
Description: An administrator can define a new retention policy with a name, description, duration, and trigger condition.   
Input: Policy name, description, duration, trigger condition.   
Output: A new retention policy record stored in the system.   
  
1.26 Retention Policy Application Function   
Function ID: FR-26   
Description: An administrator can apply a retention policy to an email or folder, ensuring the policy is enforced on the selected data.   
Input: Email or folder ID, retention policy ID.   
Output: Updated retention policy status for the selected data, and a recovery record created if applicable.   
  
1.27 Retention Policy Management Function   
Function ID: FR-27   
Description: An administrator can update or delete a retention policy, and the system will apply changes to affected data.   
Input: Retention policy ID, action type (update or delete), updated policy details (if updating).   
Output: Updated or deleted retention policy record, with a recovery record created if applicable.   
  
1.28 Expired Email Management Function   
Function ID: FR-28   
Description: An administrator can manage expired emails, including restoring or permanently deleting them.   
Input: Expired email ID, action type (restore or delete).   
Output: Updated email status (restored or deleted), and a recovery record created if applicable.   
  
1.29 Recovery Record Creation Function   
Function ID: FR-29   
Description: When an email, contact, event, or policy is modified or deleted, a recovery record is automatically created for audit and restoration purposes.   
Input: Modified or deleted data ID, action type, initiator ID.   
Output: A new recovery record stored in the system.   
  
1.30 Recovery Record Viewing Function   
Function ID: FR-30   
Description: An administrator can view recovery records to audit past actions and determine the feasibility of restoration.   
Input: Recovery record ID.   
Output: Display of full recovery record details to the administrator.

# External Description

2. External Interfaces   
This chapter describes the external interfaces of the system, including user interfaces, hardware interfaces, software interfaces, and communication interfaces. These interfaces define how the system interacts with users, external systems, hardware, and communication channels to fulfill its functional requirements.  
  
2.1 User Interface Output   
The system provides a graphical user interface (GUI) for administrators to interact with and manage email, calendar, contact, distribution group, email account, user account, and retention policy data. The interface includes screens and forms for creating, viewing, updating, and deleting these entities, as well as for performing search and management operations.   
  
- \*\*Email Management Interface\*\*:   
 - Functionality: Allows administrators to create, send, view, archive, and delete emails.   
 - Input/Output: Subject, body content, recipient list, email account selection, send/schedule option; displays email content, metadata, and status (e.g., "Sent", "Archived").   
  
- \*\*Calendar Management Interface\*\*:   
 - Functionality: Enables administrators to create, view, update, and delete calendar events.   
 - Input/Output: Title, start/end times, location, attendee list, notification settings; displays event details and updates with optional notifications.   
  
- \*\*Contact Management Interface\*\*:   
 - Functionality: Provides tools for administrators to create, view, update, and delete contacts.   
 - Input/Output: Name, email, phone number, address, notes; displays full contact details and updates.   
  
- \*\*Distribution Group Management Interface\*\*:   
 - Functionality: Allows administrators to create, modify, and delete distribution groups.   
 - Input/Output: Group name, description, contact list; displays updated group information and recovery records if applicable.   
  
- \*\*Email Account Management Interface\*\*:   
 - Functionality: Enables administrators to create, update, and delete email account records.   
 - Input/Output: Username, password, server settings, account type; displays account details and updates.   
  
- \*\*User Account Management Interface\*\*:   
 - Functionality: Provides tools for administrators to create, view, update, and delete user accounts.   
 - Input/Output: Name, email, password, role, access logs; displays user details and updates.   
  
- \*\*Retention Policy Management Interface\*\*:   
 - Functionality: Enables administrators to create, apply, and manage retention policies.   
 - Input/Output: Policy name, description, duration, trigger condition; displays policy details and changes.   
  
- \*\*Email Archive Search Interface\*\*:   
 - Functionality: Allows administrators to search for archived emails using criteria such as keywords, date ranges, senders, recipients, and email accounts.   
 - Input/Output: Search criteria; displays a list of matching archived emails.   
  
- \*\*Recovery Record Viewing Interface\*\*:   
 - Functionality: Provides administrators with the ability to view recovery records to audit past actions and assess restoration feasibility.   
 - Input/Output: Recovery record ID; displays full details of the record (e.g., action type, initiator, affected data ID).   
  
2.2 Hardware Interface Output   
The system does not directly interface with specific hardware devices. All hardware interactions are mediated through software interfaces and communication protocols. However, it relies on standard hardware components such as servers, storage devices, and network infrastructure to operate efficiently and securely.   
  
- \*\*Server Infrastructure\*\*:   
 - Role: Hosts the system and provides computational resources for processing requests and managing data.   
 - Interaction Method: Standard server-client architecture with system software running on physical or virtual servers.   
  
- \*\*Storage Devices\*\*:   
 - Role: Stores the system’s data, including emails, calendar events, contacts, distribution groups, email accounts, user accounts, and recovery records.   
 - Interaction Method: File system or block storage access for data persistence.   
  
2.3 Software Interface Output   
The system interacts with external software components and databases to manage data and provide functionality. These include email servers, databases, and third-party tools for notification and authentication.   
  
- \*\*Email Server (IMAP/SMTP)\*\*:   
 - Role: Provides the backend for sending and receiving emails.   
 - Interaction Method: IMAP and SMTP protocols for retrieving and sending emails.   
 - Input/Output: Server configuration details (e.g., host, port, authentication credentials); incoming email content and metadata; outgoing email content and status.   
  
- \*\*Database System\*\*:   
 - Role: Stores and manages all system data, including email records, calendar events, contacts, distribution groups, user accounts, retention policies, and recovery records.   
 - Interaction Method: SQL or NoSQL database queries for data storage and retrieval.   
 - Input/Output: Data records for emails, contacts, calendar events, etc., and query results for search and management operations.   
  
- \*\*Authentication and Authorization System (e.g., LDAP, OAuth)\*\*:   
 - Role: Manages user authentication and role-based access control.   
 - Interaction Method: LDAP or OAuth API calls for user login and permissions verification.   
 - Input/Output: User credentials and role assignments; authentication status and authorization tokens.   
  
- \*\*Notification Service (e.g., Email Notification Engine)\*\*:   
 - Role: Sends notifications to users for calendar events and other system-generated alerts.   
 - Interaction Method: RESTful API or message queue integration.   
 - Input/Output: Notification settings and recipient list; confirmation of notification delivery.   
  
2.4 Communication Interface Output   
The system communicates with external systems and users via network-based protocols and services, including email communication, web-based interactions, and API calls.   
  
- \*\*Email Communication Interface\*\*:   
 - Role: Enables the system to send and receive emails via configured email servers.   
 - Interaction Method: SMTP for sending emails, IMAP for receiving emails.   
 - Input/Output: Email content, recipient list, server credentials; incoming email content and metadata.   
  
- \*\*Web-Based Communication Interface\*\*:   
 - Role: Provides access to the system through a web browser or application for administrative tasks.   
 - Interaction Method: HTTP/HTTPS for secure data exchange between the system and the web client.   
 - Input/Output: User input via web forms; system responses in HTML, JSON, or XML for rendering.   
  
- \*\*API Interface for Integration\*\*:   
 - Role: Supports integration with external systems for data exchange and automation.   
 - Interaction Method: RESTful API for programmatic access to system functionalities.   
 - Input/Output: JSON/XML payloads for function inputs; structured responses for function outputs (e.g., success/failure status, record IDs).   
  
- \*\*Message Push Interface (e.g., for notifications)\*\*:   
 - Role: Sends real-time notifications to users for events and updates.   
 - Interaction Method: Webhooks or message queues for asynchronous delivery.   
 - Input/Output: Notification events (e.g., calendar updates, email deletions); delivery confirmation and user response.   
  
By clearly defining these external interfaces, the system ensures that all interactions with users, hardware, software, and communication channels are consistent, reliable, and aligned with the functional requirements outlined in this specification. Developers can use these descriptions to design and implement the system with minimal ambiguity and reduced communication overhead.