# Functional Requirement

# 1. Functional Requirements  
  
## 1.1 Email Account Creation Function   
\*\*Function ID\*\*: FR-01   
\*\*Description\*\*: Administrators can create a new email account for a user, including configuration of the email domain, password, and association with contact information.   
\*\*Input\*\*: Username, password, email domain, user ID   
\*\*Output\*\*: Created email account, associated contact record, confirmation message to the administrator   
  
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## 1.2 Email Account Management Function   
\*\*Function ID\*\*: FR-02   
\*\*Description\*\*: Administrators can update or modify an existing email account's configuration, such as password, access permissions, or recovery options.   
\*\*Input\*\*: Email account ID, updated password or permissions, user ID (if applicable)   
\*\*Output\*\*: Updated email account, synchronized email flow and recovery settings, confirmation message to the administrator   
  
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## 1.3 Email Account Deletion Function   
\*\*Function ID\*\*: FR-03   
\*\*Description\*\*: Administrators can delete an email account, removing it from email flow and recovery configurations and archiving its data according to the archive policy.   
\*\*Input\*\*: Email account ID, confirmation of deletion   
\*\*Output\*\*: Deactivated and removed email account, archived data, confirmation message to the administrator   
  
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## 1.4 Email Sending Function   
\*\*Function ID\*\*: FR-04   
\*\*Description\*\*: Administrators can send an email to one or more recipients, either individual contacts or distribution groups, with validation and routing based on email flow rules.   
\*\*Input\*\*: Sender email account ID, recipient contact or distribution group ID(s), subject, body, formatting template (if applicable)   
\*\*Output\*\*: Sent email, updated email flow record, confirmation message to the administrator   
  
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## 1.5 Email Receiving Function   
\*\*Function ID\*\*: FR-05   
\*\*Description\*\*: The system receives and processes incoming emails, storing them in the inbox or archive based on email flow and archive policy rules.   
\*\*Input\*\*: Email message from external/internal source, recipient email account ID   
\*\*Output\*\*: Stored email in inbox/archive, updated email flow record, notification to the administrator (if enabled)   
  
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## 1.6 Email Formatting Function   
\*\*Function ID\*\*: FR-06   
\*\*Description\*\*: Administrators can apply formatting to an email using a template or manual configuration, ensuring the formatting is valid and aligned with email flow rules.   
\*\*Input\*\*: Email account ID, email body, formatting rules or template   
\*\*Output\*\*: Formatted email, updated email flow record, confirmation for review   
  
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## 1.7 Email Reading Function   
\*\*Function ID\*\*: FR-07   
\*\*Description\*\*: Administrators can read emails from the inbox, with the system updating the email flow to reflect the read status.   
\*\*Input\*\*: Email account ID, email ID   
\*\*Output\*\*: Displayed email content, updated email flow status, options for reply/forward/delete   
  
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## 1.8 Email Archiving Function   
\*\*Function ID\*\*: FR-08   
\*\*Description\*\*: Administrators can archive one or more emails based on archive policy rules, removing them from the inbox and storing them in the archive module.   
\*\*Input\*\*: Email account ID, selected email ID(s), archive policy rules   
\*\*Output\*\*: Archived email(s) in storage, updated inbox, confirmation message to the administrator   
  
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## 1.9 Archived Email Search Function   
\*\*Function ID\*\*: FR-09   
\*\*Description\*\*: Administrators can search for archived emails using criteria such as sender, recipient, subject, date range, or keywords.   
\*\*Input\*\*: Search criteria (sender, recipient, subject, date range, keywords)   
\*\*Output\*\*: List of matching archived emails, options to retrieve or delete   
  
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## 1.10 Email Recovery Function   
\*\*Function ID\*\*: FR-10   
\*\*Description\*\*: Administrators can recover expired or deleted emails from the archive, restoring them to the email account's inbox or a recovery folder.   
\*\*Input\*\*: Email account ID, archived email ID(s)   
\*\*Output\*\*: Recovered email(s) in inbox or recovery folder, updated archive policy, confirmation message to the administrator   
  
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## 1.11 Contact Creation Function   
\*\*Function ID\*\*: FR-11   
\*\*Description\*\*: Administrators can create a new contact record for a user, including name, email, phone number, and address.   
\*\*Input\*\*: Name, email address, phone number, address, associated user ID   
\*\*Output\*\*: Created contact record, confirmation message to the administrator   
  
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## 1.12 Contact Management Function   
\*\*Function ID\*\*: FR-12   
\*\*Description\*\*: Administrators can update a contact's information or delete a contact, ensuring any references in distribution groups or email accounts are updated.   
\*\*Input\*\*: Contact ID, updated information or deletion confirmation   
\*\*Output\*\*: Updated or deleted contact, updated distribution groups and email accounts, confirmation message   
  
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## 1.13 Contact Reading Function   
\*\*Function ID\*\*: FR-13   
\*\*Description\*\*: Administrators can view the details of a contact, including whether it is part of any distribution groups or linked to an email account.   
\*\*Input\*\*: Contact ID   
\*\*Output\*\*: Displayed contact information, links to related email accounts or groups   
  
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## 1.14 Distribution Group Creation Function   
\*\*Function ID\*\*: FR-14   
\*\*Description\*\*: Administrators can create a new distribution group and assign contacts or email accounts as members.   
\*\*Input\*\*: Group name, description, selected contacts or email account IDs   
\*\*Output\*\*: Created distribution group with members, confirmation message   
  
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## 1.15 Distribution Group Management Function   
\*\*Function ID\*\*: FR-15   
\*\*Description\*\*: Administrators can update or delete an existing distribution group, ensuring its members and associated email configurations are synchronized.   
\*\*Input\*\*: Distribution group ID, updated information or deletion confirmation   
\*\*Output\*\*: Updated or deleted group, synchronized email flow and email account data, confirmation message   
  
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## 1.16 Calendar Event Creation Function   
\*\*Function ID\*\*: FR-16   
\*\*Description\*\*: Administrators can create a new calendar event, invite contacts or distribution groups, and send email invites via the associated email account.   
\*\*Input\*\*: Event title, description, start and end time, invited contact or group IDs   
\*\*Output\*\*: Created calendar event, sent email invites, updated email flow, confirmation message   
  
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## 1.17 Calendar Event Update Function   
\*\*Function ID\*\*: FR-17   
\*\*Description\*\*: Administrators can update an existing calendar event, including time, description, and invited participants, with optional email notifications.   
\*\*Input\*\*: Event ID, updated details, updated invited contact or group IDs   
\*\*Output\*\*: Updated calendar event, updated email flow (if invites sent), confirmation message   
  
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## 1.18 Calendar Event Deletion Function   
\*\*Function ID\*\*: FR-18   
\*\*Description\*\*: Administrators can delete a calendar event, cancel associated email invites, and update the email flow and recovery settings if needed.   
\*\*Input\*\*: Event ID, confirmation of deletion   
\*\*Output\*\*: Deleted event, updated email flow and recovery, confirmation message   
  
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## 1.19 Calendar Event Reading Function   
\*\*Function ID\*\*: FR-19   
\*\*Description\*\*: Administrators can view the details of a calendar event, including its title, time, description, and participants.   
\*\*Input\*\*: Event ID   
\*\*Output\*\*: Displayed calendar event details, options to edit or delete   
  
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## 1.20 Archive Policy Creation Function   
\*\*Function ID\*\*: FR-20   
\*\*Description\*\*: Administrators can create a new archive policy with retention periods and rules for email archiving.   
\*\*Input\*\*: Policy name, description, retention duration, start/end dates   
\*\*Output\*\*: Created archive policy, associated retention period, confirmation message   
  
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## 1.21 Archive Policy Update Function   
\*\*Function ID\*\*: FR-21   
\*\*Description\*\*: Administrators can modify an existing archive policy to change its retention rules or storage configuration.   
\*\*Input\*\*: Archive policy ID, updated retention or archive rules   
\*\*Output\*\*: Updated archive policy, recalculated email retention/deletion schedule, confirmation message   
  
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## 1.22 Archive Policy Deletion Function   
\*\*Function ID\*\*: FR-22   
\*\*Description\*\*: Administrators can delete an archive policy, ensuring that it is not in use by any email accounts or flows.   
\*\*Input\*\*: Archive policy ID, confirmation of deletion   
\*\*Output\*\*: Deleted policy, updated associated email accounts and flows, confirmation message   
  
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## 1.23 Email Flow Management Function   
\*\*Function ID\*\*: FR-23   
\*\*Description\*\*: Administrators can create, update, or delete an email flow to define routing and filtering rules for email processing.   
\*\*Input\*\*: Email flow ID or new flow details, flow rules, associated email account IDs   
\*\*Output\*\*: Updated or created email flow, synchronized with email account settings, confirmation message   
  
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## 1.24 Email Flow Capture Function   
\*\*Function ID\*\*: FR-24   
\*\*Description\*\*: The system captures the flow of emails as they are sent or received, recording details such as sender, recipient, timestamp, and status.   
\*\*Input\*\*: Email ID, flow description, timestamp   
\*\*Output\*\*: Captured and stored email flow record, confirmation of capture   
  
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## 1.25 User Management Function   
\*\*Function ID\*\*: FR-25   
\*\*Description\*\*: Administrators can create, update, or delete user records, ensuring consistency with email accounts, contacts, and archive policies.   
\*\*Input\*\*: User ID, user details (name, role, access level), associated email account or contact ID (if applicable)   
\*\*Output\*\*: Updated or created user record, synchronized related configurations, confirmation message   
  
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## 1.26 Email Ownership Assignment Function   
\*\*Function ID\*\*: FR-26   
\*\*Description\*\*: Administrators can assign ownership of an email account or calendar event to a user, ensuring the user has the appropriate access and permissions.   
\*\*Input\*\*: Email account or calendar event ID, user ID   
\*\*Output\*\*: Updated ownership, synchronized with related modules (email flow, archive policy), confirmation message   
  
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## 1.27 Contact Ownership Assignment Function   
\*\*Function ID\*\*: FR-27   
\*\*Description\*\*: Administrators can assign ownership of a contact to a user, ensuring the user can manage or access it.   
\*\*Input\*\*: Contact ID, user ID   
\*\*Output\*\*: Updated ownership, synchronized with distribution groups and email accounts, confirmation message   
  
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## 1.28 Archive Policy Application Function   
\*\*Function ID\*\*: FR-28   
\*\*Description\*\*: The system applies an archive policy to an email account, identifying and archiving emails that meet the policy criteria.   
\*\*Input\*\*: Archive policy ID, email account ID   
\*\*Output\*\*: Archived emails, updated inbox, confirmation of policy application   
  
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## 1.29 Email Recovery Record Deletion Function   
\*\*Function ID\*\*: FR-29   
\*\*Description\*\*: Administrators can delete an email recovery record, ensuring it is not in use for compliance or audit purposes.   
\*\*Input\*\*: Email recovery ID, confirmation of deletion   
\*\*Output\*\*: Deleted recovery record, updated email account and archive policy, confirmation message   
  
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## 1.30 Email Flow Assignment Function   
\*\*Function ID\*\*: FR-30   
\*\*Description\*\*: Administrators can add an email account to an email flow, ensuring the email flow is updated and synchronized with the account configuration.   
\*\*Input\*\*: Email account ID, email flow ID   
\*\*Output\*\*: Updated email flow, confirmation message   
  
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## 1.31 Email Sending to Distribution Group Function   
\*\*Function ID\*\*: FR-31   
\*\*Description\*\*: Administrators can send an email to a distribution group, with validation of group members and email flow rules.   
\*\*Input\*\*: Email account ID, distribution group ID, email content   
\*\*Output\*\*: Sent email to all valid members, updated email flow record, confirmation message   
  
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## 1.32 Email Flow Belonging Function   
\*\*Function ID\*\*: FR-32   
\*\*Description\*\*: An email account is associated with an email flow, ensuring that all sent and received emails are processed according to flow rules.   
\*\*Input\*\*: Email account ID, email flow ID   
\*\*Output\*\*: Email account included in the flow, updated flow configuration, confirmation message   
  
---  
  
## 1.33 Email Archiving According to Policy Function   
\*\*Function ID\*\*: FR-33   
\*\*Description\*\*: The system automatically archives emails based on archive policy rules, such as retention periods or content criteria.   
\*\*Input\*\*: Email account ID, archive policy ID   
\*\*Output\*\*: Archived emails, updated inbox, confirmation of archiving action   
  
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## 1.34 Email Recovery from Archive Function   
\*\*Function ID\*\*: FR-34   
\*\*Description\*\*: Administrators can recover an email from the archive and restore it to the email account's inbox or recovery folder.   
\*\*Input\*\*: Email account ID, archived email ID   
\*\*Output\*\*: Recovered email, updated archive policy, confirmation message   
  
---  
  
## 1.35 Distribution Group Membership Update Function   
\*\*Function ID\*\*: FR-35   
\*\*Description\*\*: Administrators can add or remove contacts or email accounts from a distribution group.   
\*\*Input\*\*: Distribution group ID, contact or email account ID(s), action (add/remove)   
\*\*Output\*\*: Updated group membership, confirmation message   
  
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## 1.36 Retention Period Definition Function   
\*\*Function ID\*\*: FR-36   
\*\*Description\*\*: Administrators can define a retention period for an archive policy, specifying the duration for which emails will be retained before archiving.   
\*\*Input\*\*: Archive policy ID, retention duration, start and end dates   
\*\*Output\*\*: Created or updated retention period, confirmation message   
  
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## 1.37 Retention Period Modification Function   
\*\*Function ID\*\*: FR-37   
\*\*Description\*\*: Administrators can modify an existing retention period to adjust the duration or conditions.   
\*\*Input\*\*: Retention period ID, new retention duration or conditions   
\*\*Output\*\*: Updated retention period, recalculated email retention/deletion schedule, confirmation message   
  
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## 1.38 Retention Period Deletion Function   
\*\*Function ID\*\*: FR-38   
\*\*Description\*\*: Administrators can delete a retention period, ensuring that it is not in use by any active archive policies.   
\*\*Input\*\*: Retention period ID, confirmation of deletion   
\*\*Output\*\*: Deleted retention period, updated archive policy, confirmation message   
  
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## 1.39 Archive Policy Application Execution Function   
\*\*Function ID\*\*: FR-39   
\*\*Description\*\*: The system executes the archive policy application, identifying and archiving emails based on the defined policy.   
\*\*Input\*\*: Email account ID, archive policy ID   
\*\*Output\*\*: Archived emails, updated inbox, updated archive policy application log, confirmation message   
  
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# External Description

# 2. External Interfaces  
  
This chapter describes the external interfaces that the system interacts with to fulfill its functional requirements. These interfaces are categorized into four sections: user interfaces, hardware interfaces, software interfaces, and communication interfaces. Each interface is clearly defined, including its role and the interaction method with the system.  
  
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## 2.1 User Interface Output  
  
The system provides a graphical user interface (GUI) for administrators to manage email accounts, contacts, distribution groups, calendar events, and archive policies. The interface allows users to input data, view results, and perform actions such as creation, modification, and deletion.  
  
### 2.1.1 Email Account Creation and Management Interface   
\*\*Description\*\*: A GUI interface where administrators can create, update, or delete email accounts. It includes fields for entering usernames, passwords, email domains, and user IDs.   
\*\*Interaction Method\*\*:   
- Input: Form submission with fields for username, password, domain, and user ID (for creation).   
- Output: Display of the created or updated email account and a confirmation message.   
  
### 2.1.2 Contact Creation and Management Interface   
\*\*Description\*\*: A GUI interface for administrators to create, update, or delete contact records. It includes fields for name, email, phone number, address, and associated user ID.   
\*\*Interaction Method\*\*:   
- Input: Form submission with contact details (name, email, phone, address, and user ID).   
- Output: Display of the created or updated contact and a confirmation message.   
  
### 2.1.3 Distribution Group Creation and Management Interface   
\*\*Description\*\*: A GUI interface for administrators to create, update, or delete distribution groups. It allows selection of contacts or email accounts to be added to the group.   
\*\*Interaction Method\*\*:   
- Input: Form submission with group name, description, and selected members.   
- Output: Display of the created or updated group with a confirmation message.   
  
### 2.1.4 Calendar Event Creation and Management Interface   
\*\*Description\*\*: A GUI interface for administrators to create, update, or delete calendar events. It includes fields for event title, description, time, and participants (contacts or groups).   
\*\*Interaction Method\*\*:   
- Input: Form submission with event details and invited participants.   
- Output: Display of the created or updated calendar event and a confirmation message.   
  
### 2.1.5 Archive Policy Creation and Management Interface   
\*\*Description\*\*: A GUI interface for administrators to define and manage archive policies. It includes fields for policy name, description, retention duration, and application rules.   
\*\*Interaction Method\*\*:   
- Input: Form submission with archive policy details.   
- Output: Display of the created or updated archive policy and a confirmation message.   
  
### 2.1.6 Email Reading Interface   
\*\*Description\*\*: A GUI interface for administrators to view the content of emails in the inbox. It also displays options for replying, forwarding, or deleting emails.   
\*\*Interaction Method\*\*:   
- Input: Selection of an email ID.   
- Output: Display of the email content and status update (e.g., "read").   
  
### 2.1.7 Archived Email Search Interface   
\*\*Description\*\*: A GUI interface for administrators to search archived emails using criteria such as sender, recipient, subject, date range, or keywords.   
\*\*Interaction Method\*\*:   
- Input: Form submission with search criteria.   
- Output: Display of a list of matching archived emails with options to retrieve or delete.   
  
### 2.1.8 Email Flow Management Interface   
\*\*Description\*\*: A GUI interface for administrators to manage email flows, including defining, updating, or deleting routing and filtering rules.   
\*\*Interaction Method\*\*:   
- Input: Form submission with flow details and rules.   
- Output: Display of the updated or created email flow and a confirmation message.   
  
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## 2.2 Hardware Interface Output  
  
The system does not directly interact with external hardware devices. Therefore, there are no hardware interfaces required for this system.  
  
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## 2.3 Software Interface Output  
  
The system interacts with various software components and external data sources to manage email and related data effectively.  
  
### 2.3.1 Email Database Interface   
\*\*Description\*\*: Interface to the email database, which stores all email account information, email content, and related metadata.   
\*\*Interaction Method\*\*:   
- Input: Queries for creating, updating, deleting, or retrieving email records.   
- Output: Email account and email records stored or retrieved in the database.   
  
### 2.3.2 Contact Database Interface   
\*\*Description\*\*: Interface to the contact database, which stores user contact information and relationships with email accounts and distribution groups.   
\*\*Interaction Method\*\*:   
- Input: Queries for creating, updating, deleting, or retrieving contact records.   
- Output: Contact records stored or retrieved in the database.   
  
### 2.3.3 Distribution Group Database Interface   
\*\*Description\*\*: Interface to the distribution group database, which stores group definitions and member associations.   
\*\*Interaction Method\*\*:   
- Input: Queries for creating, updating, deleting, or retrieving distribution groups.   
- Output: Distribution group records stored or retrieved in the database.   
  
### 2.3.4 Calendar Event Database Interface   
\*\*Description\*\*: Interface to the calendar event database, which stores event details, time, description, and invitee information.   
\*\*Interaction Method\*\*:   
- Input: Queries for creating, updating, deleting, or retrieving calendar events.   
- Output: Calendar event records stored or retrieved in the database.   
  
### 2.3.5 Archive Policy Database Interface   
\*\*Description\*\*: Interface to the archive policy database, which stores archive policy definitions, retention periods, and application logs.   
\*\*Interaction Method\*\*:   
- Input: Queries for creating, updating, deleting, or retrieving archive policies and retention periods.   
- Output: Archive policy and retention period records stored or retrieved in the database.   
  
### 2.3.6 Email Flow Database Interface   
\*\*Description\*\*: Interface to the email flow database, which stores routing and filtering rules for email processing.   
\*\*Interaction Method\*\*:   
- Input: Queries for creating, updating, deleting, or retrieving email flow records.   
- Output: Email flow records stored or retrieved in the database.   
  
### 2.3.7 Email Archiving Module Interface   
\*\*Description\*\*: Interface to the archive module, which handles the storage and retrieval of archived emails.   
\*\*Interaction Method\*\*:   
- Input: Email account ID and archive policy ID to trigger archiving.   
- Output: Archived emails stored in the archive module and inbox updated.   
  
### 2.3.8 Email Recovery Module Interface   
\*\*Description\*\*: Interface to the recovery module, which manages the retrieval of deleted or expired emails.   
\*\*Interaction Method\*\*:   
- Input: Email account ID and archived email ID(s) to request recovery.   
- Output: Recovered emails restored to the inbox or recovery folder.   
  
### 2.3.9 Email Formatting Engine Interface   
\*\*Description\*\*: Interface to the formatting engine, which applies email templates or formatting rules to emails.   
\*\*Interaction Method\*\*:   
- Input: Email body and formatting rules or template.   
- Output: Formatted email content ready for sending.   
  
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## 2.4 Communication Interface Output  
  
The system communicates with external systems and services through various communication interfaces to support sending and receiving emails, notifications, and synchronization of data.  
  
### 2.4.1 Email Sending Interface   
\*\*Description\*\*: Interface to send emails to one or more recipients, including validation and routing based on email flow rules.   
\*\*Interaction Method\*\*:   
- Input: Sender account ID, recipient contact/group ID(s), subject, body, and formatting template.   
- Output: Email sent to the specified recipients and an updated email flow record.   
  
### 2.4.2 Email Receiving Interface   
\*\*Description\*\*: Interface to receive and process incoming emails from external or internal sources.   
\*\*Interaction Method\*\*:   
- Input: Email message and recipient account ID.   
- Output: Email stored in the inbox or archive and an updated email flow record.   
  
### 2.4.3 Email Flow Capture Interface   
\*\*Description\*\*: Interface to record the flow of emails as they are sent or received, including sender, recipient, timestamp, and status.   
\*\*Interaction Method\*\*:   
- Input: Email ID, flow description, and timestamp.   
- Output: Captured email flow record stored in the database.   
  
### 2.4.4 Email Notification Interface   
\*\*Description\*\*: Interface to send confirmation or status update messages to the administrator.   
\*\*Interaction Method\*\*:   
- Input: Notification content and administrator user ID.   
- Output: Displayed or sent notification to the administrator.   
  
### 2.4.5 Email Sending to Distribution Group Interface   
\*\*Description\*\*: Interface to send an email to a distribution group, validating group membership and routing rules.   
\*\*Interaction Method\*\*:   
- Input: Email account ID, distribution group ID, and email content.   
- Output: Email sent to all valid members of the group and an updated email flow record.   
  
### 2.4.6 Email Flow Assignment Interface   
\*\*Description\*\*: Interface to assign an email account to an email flow, ensuring that the flow is updated and synchronized.   
\*\*Interaction Method\*\*:   
- Input: Email account ID and email flow ID.   
- Output: Updated email flow configuration and a confirmation message.   
  
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## Cross-Check of External Data Sources  
  
All external data sources referenced in the functional requirements have been mapped to corresponding interfaces in this section. Specifically:  
  
- \*\*Email Account\*\* → Email Database Interface   
- \*\*Contact Record\*\* → Contact Database Interface   
- \*\*Distribution Group\*\* → Distribution Group Database Interface   
- \*\*Calendar Event\*\* → Calendar Event Database Interface   
- \*\*Archive Policy\*\* → Archive Policy Database Interface   
- \*\*Email Flow\*\* → Email Flow Database Interface   
- \*\*Email Content\*\* → Email Sending and Receiving Interfaces   
- \*\*Email Formatting\*\* → Email Formatting Engine Interface   
- \*\*Email Archiving/Recovery\*\* → Email Archiving and Recovery Module Interfaces   
- \*\*Email Flow Records\*\* → Email Flow Capture Interface   
- \*\*Notifications\*\* → Email Notification Interface   
  
This ensures that every referenced data source is clearly defined and supported through the appropriate external interface.  
  
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## Summary  
  
The external interfaces described in this chapter are essential for the system to perform its core functions. They support the interaction between the system and its internal data sources, administrators, and external communication channels. Developers can use these interface definitions to design and implement the necessary components, ensuring a seamless and efficient system operation.