# Functional Requirement

# 1. Functional Requirements  
  
## 1.1 Email Creation Function   
Function ID: FR-01   
Description: Administrators can create new email accounts with associated distribution groups.   
Input: Email address, password, contact information, selected distribution group   
Output: Created email account with status set to active, added to the specified distribution group  
  
## 1.2 Email Sending Function   
Function ID: FR-02   
Description: Users can compose and send emails to individual contacts or distribution groups.   
Input: Selected email account, subject, body content, attachment files, recipient contact/distribution group selection   
Output: Sent email with timestamp, status set to sent, copy stored in archive if configured  
  
## 1.3 Email Receiving Function   
Function ID: FR-03   
Description: System automatically receives and processes incoming emails for associated accounts.   
Input: Email server connection, active email account, system notification settings   
Output: Received email with sender/receiver information, timestamp, status set to received, copy stored in archive if configured  
  
## 1.4 Email Viewing Function   
Function ID: FR-04   
Description: Administrators can view email contents from inbox or archive.   
Input: Selected email ID, administrator credentials, viewing permissions   
Output: Displayed email content including subject, sender, recipient, body, and attachments, email status updated to read  
  
## 1.5 Email Reply Function   
Function ID: FR-05   
Description: Users can reply to received emails and send responses.   
Input: Selected email to reply to, reply content (subject, body, attachments), active email account   
Output: Sent reply email, original email marked as replied, reply copy stored in archive if configured  
  
## 1.6 Email Forwarding Function   
Function ID: FR-06   
Description: Users can forward received emails to new recipients.   
Input: Selected email to forward, forwarding content (subject, body, attachments), new recipient contact/distribution group selection, active email account   
Output: Sent forwarded email, original email marked as forwarded, forwarded copy stored in archive if configured  
  
## 1.7 Email Archiving Function   
Function ID: FR-07   
Description: System can move selected emails to archive storage for long-term retention.   
Input: Selected email ID, archive configuration settings, administrator credentials   
Output: Archived email with archive date, retention period, and status set to archived  
  
## 1.8 Email Recovery Function   
Function ID: FR-08   
Description: Administrators can restore archived emails to inbox.   
Input: Selected archive record ID, administrator credentials, recovery permissions   
Output: Recovered email in inbox with recovery date, archive status updated to recovered  
  
## 1.9 Contact Management Function   
Function ID: FR-09   
Description: Administrators can add, edit, or delete contact records associated with email accounts.   
Input: Contact details (name, email address, phone number, address), distribution group association, administrator credentials   
Output: Updated contact records with status tracking, associated email account and distribution group updates  
  
## 1.10 Distribution Group Management Function   
Function ID: FR-10   
Description: Administrators can create, update, or delete distribution groups and manage their members.   
Input: Group name, description, member contacts/accounts, administrator credentials   
Output: Updated distribution groups with valid members and status tracking  
  
## 1.11 Email Account Management Function   
Function ID: FR-11   
Description: Administrators can update or delete email account records and associated data.   
Input: Email account details (username, password, status), administrator credentials   
Output: Updated or deleted email account with cascading updates to contacts and distribution groups  
  
## 1.12 Administrator Management Function   
Function ID: FR-12   
Description: Administrators can assign or remove administrator privileges from users.   
Input: Target user account, administrator credentials, access permissions   
Output: Updated administrator records with role changes and access updates  
  
## 1.13 Email Template Management Function   
Function ID: FR-13   
Description: Administrators can create, update, or delete reusable email templates.   
Input: Template name, content, creator information, email account/distribution group association, administrator credentials   
Output: Updated email template records with version tracking and archive capability  
  
## 1.14 Email Settings Management Function   
Function ID: FR-14   
Description: Administrators can configure email account preferences like themes, language, and notification settings.   
Input: Selected email account, settings parameters (theme, language, signature, notification settings), administrator credentials   
Output: Updated email settings record with applied configurations  
  
## 1.15 Archive Record Management Function   
Function ID: FR-15   
Description: Administrators can view, edit, or delete archive records.   
Input: Selected archive record ID, administrator credentials, modification parameters (tags, retention status)   
Output: Updated archive records with metadata changes, deletion tracking  
  
## 1.16 Email Deletion Function   
Function ID: FR-16   
Description: Administrators can delete emails from inbox or archive.   
Input: Selected email ID, administrator credentials, deletion confirmation   
Output: Deleted email record, updated inbox/archive status, audit log entry  
  
## 1.17 Email Formatting Function   
Function ID: FR-17   
Description: System supports formatting of emails with text styling and layout options.   
Input: Email content, formatting instructions (font style, size, color, layout)   
Output: Formatted email content ready for sending or viewing  
  
## 1.18 Email Filtering Function   
Function ID: FR-18   
Description: System allows filtering of emails based on criteria like date range, contacts, or distribution groups.   
Input: Filter criteria (date range, contact, group), administrator/user credentials   
Output: Filtered list of emails for viewing or exporting  
  
## 1.19 Email Export Function   
Function ID: FR-19   
Description: Administrators can export selected email data in specified formats.   
Input: Export criteria (email account, date range, contacts/groups), selected format (CSV, PDF, etc.), administrator credentials   
Output: Exported file with structured email data, download availability confirmation  
  
## 1.20 Email Validation Function   
Function ID: FR-20   
Description: System validates email content and recipient information before sending.   
Input: Email content, recipient information, email account status   
Output: Validation results, error/warning messages if validation fails  
  
## 1.21 Email Status Tracking Function   
Function ID: FR-21   
Description: System tracks and updates email statuses throughout its lifecycle.   
Input: Email event (sent, received, read, archived, recovered, deleted)   
Output: Updated email status field in database  
  
## 1.22 Email Template Application Function   
Function ID: FR-22   
Description: Users can apply pre-defined email templates when composing new emails.   
Input: Selected template ID, template parameters, email account   
Output: Composed email using template content, template reference tracking  
  
## 1.23 Email Storage Function   
Function ID: FR-23   
Description: System stores emails and related data in database with metadata tracking.   
Input: Email content, sender/receiver information, timestamp, status   
Output: Persisted email record in database with full metadata  
  
## 1.24 Email Access Control Function   
Function ID: FR-24   
Description: System enforces access control policies for email viewing, management, and operations.   
Input: User credentials, requested operation, target email/contact/group/resource   
Output: Access granted/denied status, operation execution result  
  
## 1.25 Email Notification Function   
Function ID: FR-25   
Description: System provides notifications for email events like new messages or archive actions.   
Input: Notification settings, email event (new email received, email sent, archive action)   
Output: Delivered notification to user/administrator  
  
## 1.26 Email Association Function   
Function ID: FR-26   
Description: System manages associations between emails, accounts, templates, and archive records.   
Input: Email ID, account ID, template ID, archive ID   
Output: Updated association records in database  
  
## 1.27 Email Error Logging Function   
Function ID: FR-27   
Description: System logs errors and warnings during email operations for troubleshooting.   
Input: Error event (invalid data, failed send/receive/archive), system status information   
Output: Recorded error log entry with timestamp and details  
  
## 1.28 Email Search Function   
Function ID: FR-28   
Description: System allows searching for emails in inbox or archive by keywords or metadata.   
Input: Search query (subject, sender, recipient, date range), administrator/user credentials   
Output: List of matching emails with relevant metadata  
  
## 1.29 Email Auto-reply Function   
Function ID: FR-29   
Description: System supports configuring and sending automated reply emails.   
Input: Auto-reply settings, trigger conditions (time-based, specific senders), template content   
Output: Sent auto-reply email, status tracking of auto-reply action  
  
## 1.30 Email Security Function   
Function ID: FR-30   
Description: System ensures secure handling of email data and credentials.   
Input: Email content, user credentials, security policies   
Output: Encrypted data storage, secure authentication, access control enforcement  
  
## 1.31 Email Audit Function   
Function ID: FR-31   
Description: System maintains audit trails for all email-related operations.   
Input: Operation type (create, send, receive, archive, recover, delete), operator information   
Output: Created audit log entry with timestamp and details  
  
## 1.32 Email Retention Policy Enforcement Function   
Function ID: FR-32   
Description: System enforces configured retention policies for email archiving.   
Input: Email metadata, retention policy rules   
Output: Automated archiving decision, email status updates based on policy  
  
## 1.33 Email Statistics Reporting Function   
Function ID: FR-33   
Description: System generates reports on email activity and archive status.   
Input: Report criteria (email account, time period, activity type), administrator credentials   
Output: Generated report with statistical data and visualizations  
  
## 1.34 Email Backup Function   
Function ID: FR-34   
Description: System creates backups of email data and archive records.   
Input: Backup schedule, selected data for backup   
Output: Created backup file, backup status confirmation  
  
## 1.35 Email Restoration Function   
Function ID: FR-35   
Description: System can restore email data from backups.   
Input: Backup file, restoration criteria, administrator credentials   
Output: Restored email data, updated status of restored items  
  
## 1.36 Email Template Validation Function   
Function ID: FR-36   
Description: System validates email templates for content and format integrity.   
Input: Template content, template configuration   
Output: Validation result, error/warning messages if validation fails  
  
## 1.37 Email Configuration Function   
Function ID: FR-37   
Description: System manages configuration settings for email operations.   
Input: Configuration parameters (server settings, archive rules), administrator credentials   
Output: Updated configuration records, system behavior changes based on configuration

# External Description

# 2. External Interfaces   
  
This chapter outlines the external interfaces of the system, detailing the user interfaces, hardware interfaces, software interfaces, and communication interfaces that facilitate interaction with external entities. These interfaces are derived from the functional requirements to ensure comprehensive coverage of all necessary components for system integration and operation.   
  
## 2.1 User Interface   
  
The user interface of the system is designed to support both administrators and users in performing a wide range of email and contact management tasks. The interface includes forms, menus, and dashboards that allow for intuitive interaction with the system.   
  
- \*\*Email Creation Interface\*\*: A form for administrators to create new email accounts and associate them with distribution groups. Inputs include email address, password, contact information, and distribution group selection. Outputs include confirmation of account creation and status updates.   
- \*\*Email Composition Interface\*\*: A user-friendly editor for composing and sending emails, including options for adding subject lines, body content, attachments, and selecting recipients (individuals or distribution groups).   
- \*\*Email Inbox Interface\*\*: A display area where users can view incoming emails with sender/receiver information, timestamps, and statuses (e.g., received, read).   
- \*\*Email Archive Interface\*\*: A dedicated section where archived emails are stored and can be viewed, edited, or deleted by administrators.   
- \*\*Email Settings Interface\*\*: A configuration panel where administrators can adjust preferences such as themes, language, signature, and notification settings.   
- \*\*Email Filtering and Search Interface\*\*: A control panel that allows users and administrators to filter and search emails based on metadata (e.g., sender, recipient, date range) or keywords.   
- \*\*Email Template Management Interface\*\*: A screen for administrators to create, update, and delete reusable email templates, as well as apply them when composing new emails.   
- \*\*Contact and Distribution Group Management Interface\*\*: A screen for administrators to manage contact records and distribution groups, including adding, editing, and deleting entries.   
- \*\*Email Reporting and Statistics Interface\*\*: A dashboard for administrators to generate reports on email activity and archive status, with visualizations and statistical data.   
- \*\*Email Backup and Restoration Interface\*\*: A tool for administrators to configure and execute backup and restoration operations for email data and archive records.   
  
The user interface ensures secure access through authentication and role-based permissions. It also supports audit trails for all user actions and provides feedback to users in the form of success or error messages.   
  
## 2.2 Hardware Interface   
  
The system does not require direct interaction with hardware devices beyond standard computing hardware (e.g., servers, storage devices, and client machines). However, the system may utilize hardware components for performance and scalability.   
  
- \*\*Email Server\*\*: The system connects to an email server (e.g., SMTP, IMAP, POP3) to handle the sending and receiving of emails. The hardware interface includes the communication protocols used (e.g., TCP/IP) and the server's capacity and performance requirements.   
- \*\*Storage Devices\*\*: The system may interact with external storage devices for archiving and backing up email data. The interface includes support for standard storage protocols (e.g., SCSI, SATA) and the system's data retention and retrieval requirements.   
- \*\*Network Infrastructure\*\*: The system relies on a stable network connection for communication with external services and email servers. The interface includes support for standard network hardware (e.g., routers, switches) and protocols (e.g., HTTP, HTTPS).   
  
## 2.3 Software Interface   
  
The system interacts with various software components, including databases, third-party tools, and internal modules. These interfaces are critical for data storage, retrieval, and processing.   
  
- \*\*Database Interface\*\*: The system interacts with a database to store and retrieve email data, contacts, distribution groups, templates, and audit logs. The interface supports SQL-based queries for managing records and metadata.   
 - \*\*Email Records\*\*: Stored in the database with metadata such as sender, recipient, timestamp, and status.   
 - \*\*Contact Records\*\*: Managed in the database with fields for name, email address, phone number, and address.   
 - \*\*Distribution Groups\*\*: Maintained in the database with information about group name, description, and members.   
 - \*\*Email Templates\*\*: Stored in the database with version tracking and archive capability.   
 - \*\*Archive Records\*\*: Managed in the database with details about archive date, retention period, and status.   
 - \*\*Audit Logs\*\*: Stored in the database with information about operations performed, including operator, timestamp, and details.   
- \*\*Email Server Software\*\*: The system communicates with email server software (e.g., Microsoft Exchange, Postfix) to send and receive emails. The interface includes API calls or direct protocol support (e.g., SMTP for sending, IMAP for receiving).   
- \*\*Security Software\*\*: The system interacts with security software to enforce encryption, secure authentication, and access control policies. The interface includes secure protocols (e.g., TLS, OAuth) and encryption standards (e.g., AES-256).   
- \*\*Third-Party Tools\*\*: The system may integrate with third-party tools for additional functionality, such as backup and restoration tools (e.g., rsync, Bacula) and reporting tools (e.g., Tableau, Power BI). The interface includes API-based integration for data exchange.   
- \*\*Email Export Tools\*\*: The system provides an interface for exporting email data in various formats (e.g., CSV, PDF). The interface includes data formatting and file generation logic.   
  
## 2.4 Communication Interface   
  
The system communicates with external systems and users via network-based protocols and email services to ensure seamless data exchange and notifications.   
  
- \*\*Email Sending and Receiving Interface\*\*: The system communicates with email servers via SMTP, IMAP, or POP3 protocols to send and receive emails. This interface handles authentication, encryption, and error logging during email operations.   
- \*\*Notification Interface\*\*: The system sends notifications for email events such as new messages, archive actions, or system errors. The interface supports real-time or scheduled notifications via email, in-system alerts, or integration with external messaging platforms (e.g., Slack, Microsoft Teams).   
- \*\*Archive Communication Interface\*\*: The system communicates with the archive database to store and retrieve archived emails. This interface includes mechanisms for updating statuses (e.g., archived, recovered) and managing retention policies.   
- \*\*Backup and Restoration Communication Interface\*\*: The system communicates with external storage or backup tools to execute backup and restoration operations. The interface includes support for scheduling, data verification, and status confirmation.   
- \*\*User Communication Interface\*\*: The system supports user communication via web-based access (e.g., HTTP, HTTPS) and mobile clients (e.g., IMAP over SSL). This interface ensures secure and responsive interaction with user devices.   
- \*\*System-to-System Communication Interface\*\*: The system may communicate with other internal or external systems (e.g., CRM, directory services) via RESTful APIs or SOAP-based services. The interface supports authentication, data formatting, and error handling for these interactions.   
  
These communication interfaces ensure that the system can operate efficiently in a networked environment and support collaboration between users, administrators, and external systems.   
  
---   
  
This section ensures that all external data sources and interaction methods mentioned in the functional requirements are clearly defined and categorized. Developers can use this information to design and implement the necessary interfaces for the system.