



Mobile Email Requirements

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1. Scope

(Informative)

Mobile email is defined as an email enabler optimized to support email usage in mobile devices and wireless networks. This document describes various use cases to illustrate key mobile email usage patterns and will also provide a comprehensive set of high level requirements that can be derived from the use cases. High-level requirements can be used as a basis for more detailed architecture definition work for a Mobile Email enabler

This Requirements Document focuses on requirements for the enabler specifications rather than for particular implementations of those. Whether the described features are optional or mandatory for implementations will be decided at a later stage.

2. References

2.1 Normative References

- [RFC2119] “Key words for use in RFCs to Indicate Requirement Levels”, S. Bradner, March 1997, URL: <http://www.ietf.org/rfc/rfc2119.txt>
- [Privacy] “OMA Privacy Requirements for Mobile Services: OMA-RD-Privacy-V1_0-20031104-C”, URL: http://www.openmobilealliance.org/release_program/docs/RD/OMA-RD_Privacy-V1_0-20031104-C.pdf
- [RFC5321] “Simple Mail Transfer Protocol”, URL: <http://www.ietf.org/rfc/rfc5321.txt>
- [RFC5322] “IETF Internet Message Format”, URL: <http://www.ietf.org/rfc/rfc5322.txt>
- [RFC2045] “Multipurpose Internet Mail Extensions (MIME) Part One: Format of Internet Message Bodies, URL: <http://www.ietf.org/rfc/rfc2045.txt>
- [OMA DIC] Dictionary for OMA Specifications, URL: http://www.openmobilealliance.org/ftp/Public_documents/ARCH/permanent_documents/OMA-Dictionary-V2_1-20040914-A.zip

2.2 Informative References

- [Performance] OMA Application Performance Issues Report: OMA-RPT-ApplicationPerformance-V1_0-20031028-A, URL: http://www.openmobilealliance.org/ftp/PD/OMA-RPT-ApplicationPerformance-V1_0-20031028-A.zip.

3. Terminology and Conventions

3.1 Conventions

The key words “MUST”, “MUST NOT”, “REQUIRED”, “SHALL”, “SHALL NOT”, “SHOULD”, “SHOULD NOT”, “RECOMMENDED”, “MAY”, and “OPTIONAL” in this document are to be interpreted as described in [RFC2119].

All sections and appendixes, except “Scope” and “Introduction”, are normative, unless they are explicitly indicated to be informative.

3.2 Definitions

Attachment	A body part can be designated "attachment" to indicate that it is separate from the main body of the Email Message, and that its display should not be automatic, but contingent upon some further action of the user. Attachments can be displayed in-line or separately based on the indicated presentation semantic, e.g. graphics or word processing files.
Body	A body consists of one or more parts that follow the header. A body could include a combination of some or all of the following: [RFC5322] defined plain text parts [RFC2045] defined MIME parts, e.g. multimedia content (e.g. SMIL, HTML) and other attachment(s) (e.g. word document, PDF, GIF, JPEG etc...)
Email Events/Event	Changes to the status of an email (e.g. read/unread, moved, flagged, deleted, etc...) that result for example from performing an operation (e.g., reading, moving, deleting etc.) on an email message. They may be considered as server or client side events depending on where the change takes place. A new email is also considered as an event.
Email Message	A sequence of data containing a Header (including Meta Data) and optionally a Body. Email Message Headers and Bodies are defined in [RFC5322] “Internet Message Format”
Filtering Rules	A set of actions and conditions where the conditions are evaluated to determine which new email events and what email notifications should be sent from the client to the server or from the server to the client. They also include rules to select what new emails should be delivered from the server to the Mobile Email Client. This may be based on several criteria like subject, date, sender, folder where it is located etc...
Header	A sequence of lines of characters whose syntax includes a field name followed by a colon (“:”) and followed by a field body. Mandatory Headers included in emails are ‘To:’ and ‘From:’. Headers can also include additional custom end-to-end message headers. Source: IETF [RFC5322] “Internet Message Format”.
Meta Data	Machine-generated attributes applied by the server at delivery time appearing in [RFC5322] header fields. Examples include “RESENT” header field, Message Context (voicemail, email, MMS, SMS) and Processing Rules results.
Mobile Email	Enabling technologies that facilitate end-to-end application level interoperable email transactions (e.g. submission, retrieval, notification etc) to and from mobile devices.
Processing Rules	Actions and conditions that are applied on new email on both sending and receiving. They include: spam prevention, filtering rule, antivirus processing and other scans, attachment removal.
Server to Client Notification	A means by which the server informs the client of Email Events such as the arrival of a new email message.

3.3 Abbreviations

2.5	Upgraded Second Generation of Cellular Network
3G	Third Generation of Cellular Network

CORP	Corporate
DRM	Digital Rights Management
DS	Data Synchronization
HTML	HyperText Markup Language
HTTP	HyperText Transport Protocol
HTTPS	HTTP Over SSL
IMAP4	Internet Message Access Protocol 4
IP	Internet Protocol
IrDA	Infrared Data Association
MIME	Multipurpose Internet Mail Extensions
MMS	Multimedia Messaging Service
OMA	Open Mobile Alliance
P2P	Peer to Peer
PDA	Personal Digital Assistant
PIM	Personal Information Manager
POP3	Post Office Protocol 3
QoS	Quality of Service
RD	Requirement Document
SIP	Session Initiation Protocol
SMIL	Synchronous Multimedia Integration Language
SMS	Short Message Service
SMTP	Simple Mail Transfer Protocol
SSL	Secure Socket Layer
TLS	Transport Layer Security
VPN	Virtual Private Network
WAP	Wireless Application Protocol
WLAN	Wireless Local Area Network

4. Introduction

(Informative)

The proliferation of proprietary solutions for implementing email services on mobile devices made available through different vendors proves the need for an industry standard for Mobile Email. Mobile Email is considered a key enabler for the mobilization of enterprises. The lack of standards potentially creates a significant burden on an enterprise's IT and services management infrastructure when a multitude of end-user devices need to be supported. The standardization of a Mobile Email enabler will allow enterprises to cost-efficiently provide its remote mobile workers access to corporate email as well as address the wider challenge of promoting email services to consumer users, i.e. a broader community of mobile users than closed enterprise networks. Service providers will have an additional source of revenue and vendors will have a common set of specifications to build Mobile Email clients and servers.

4.1 Overview

This section describes the challenges associated with the mobile email enabler.

4.1.1 Main Expectations

The main expectations for mobile email are:

- To receive quasi-instantaneous notification of new emails when within coverage (if setup this way)
- To reflect quasi-instantaneously new email or email server events in the Mobile Email client when within coverage
- To send quasi-instantaneously email composed on Mobile Email client from appropriate email server when within coverage or as soon that coverage is established otherwise.
- To efficiently manipulate emails / drafts / attachment as needed or as preferred
- End-to-end secure when needed (e.g. emails may at no point be in clear text outside of the enterprise domain)
- Low cost of usage (e.g. traffic / bandwidth optimization, predictable cost, manageable traffic, ...)

Note that the notion of quasi-instantaneous refers to the impression of the user and not to a particular precise duration.

4.1.2 Additional Considerations

The following considerations are also related to mobile email:

- Need for graceful degradation and selection of server-to-client notifications that allows the client to adapt the user experience based on network conditions including for instance not retrieving attachments, or requesting smaller portions of the attachment.
- DRM rules: how to respect DRM rules like forward lock.
- Provisioning / setup: These user operations are extremely challenging on mobile devices with limited or challenging input capabilities and users need simple mobile device setup.
- The mobile email enabler needs to support charging so that Operators can charge for the services used.
- Synchronization with other clients.
- Relationship to PIM (agenda / Address Book) that may be provided jointly or separately.

NOTE: DRM is not addressed by Mobile Email enabler. It is assumed that the player on any target device will require and enforce DRM rights.

4.1.3 Main Actors

The main actors are:

- User
- Vendors
- Operators of the mobile network
- Email service providers:
 - Service providers (e.g. Operators, other email server providers)
 - Enterprises

4.2 Challenges

4.2.1 Devices

Devices present the following challenges that directly impact mobile email:

- Constrained memory / processing power (always improving):
 - Wide range to support
- Limited battery life (will remain a problem for a long time):
 - Constrains processing capability
 - Constrains the connectivity pattern (not always fully connected but may be awakened via outband notifications...)
 - > Notifications / wake-up are to be supported by mobile email
 - Constraints acceptable bandwidth
- Exotic platforms:
 - Sometimes proprietary or closed
 - Challenging or controlled software distribution channels:
 - > Installing, provisioning, supporting, upgrading...
 - E.g. DRM trusted clients
 - > Wide range of control models by:
 - device manufacturer, operator, enterprise, user

4.2.2 Networks and operators

Mobile networks and operators impose additional constraints that must be taken into account when designing mobile email solutions:

- Different underlying network technologies / bearers with different behaviour / capabilities
- Intermittent connectivity:
 - Loss of coverage
 - Nature of mobility (e.g. radio turned off in planes)
 - Temporary IP addresses
 - Unreliable delivery (Connection)

- Underlying network layer (up to transport) may drop at any time. Even if then re-established, sessions at the transport level are maintained only if the transport protocol provide mechanisms to maintain it when the network connection is re-established. Otherwise, additional mechanisms are needed at the application protocol layer to establish and maintain/recover session if a session is needed or assumed.
- Out band notification schemes:
 - > Additional challenges may be met when relying on notification mechanisms for email events that may be separate from the email exchange data channel like possible unreliable channels (e.g. notifications may be lost, delayed, unable to be delivered on some networks etc...). On the other hand such mechanisms present the advantage of being usable to wake up or reach clients that are not always connected to the email server
 - > But can be used as "wake up / notification scheme"
- Limited bandwidth:
 - > Limited capabilities shared across all users
 - > Roaming within and across domain / operators / technologies
- Cost of usage:
 - > Multiple cost models (free, unlimited, per packet, per service / type of service, ...)
 - > In general... Costly and in need of optimization to maintain cost acceptable enough to user and to allow operator to share network with enough users.
- Controlled:
 - > Walled garden:
 - Inbound and outbound traffic
 - Internal traffic
 - > With its own authentication mechanisms etc...
- Regulated:
 - > QoS
 - > Privacy
 - > Exchanged data
 - > Reachability
 - > Logging
 - > Accountability,
 - > Support desk (inexperienced users, hard to provision)
- Huge subscriber sets
 - > Server scalability is critical (email server / mobile email enabling server
 - = Solutions that tie-up ports per devices / user are not scalable
 - E.g. IDLE sessions for each devices tie-up ports and create large queues.
 - > Support desk challenges

4.2.3 Enterprises and other email service providers

Enterprises must reconcile mobile email deployments with the following requirements:

- Walled garden intranets:
 - Firewalls, VPN, ...
- IT Corporate security guidelines:

- Wide range - in general VERY conservative e.g.
 - > Require end-to-end security
 - > Allowed applications / usages / content
 - > Firewalls / ports / protocols
 - > No storage of company data outside intranet on defined servers (in clear or not). Current email infrastructure with untraceable potential intermediate storage is accepted.

Note: Intermediate storage as currently performed in the internet while routing email is not considered as covered by the above concern as the servers are not known apriori.
- Regulated:
 - E.g. Journaling / Storage of all corporate emails
- Control usage costs and support (including provisioning)
- Need to integrate with existing IT infrastructure (instead of replacing them).
- Similar scalability need of email servers / mobile email enabling servers.

4.3 Security Considerations

The mobile email enabler must address the security issues raised by the different deployment models identified above. In particular, it must be able to fulfill the high levels of security that the enterprise environment demands while being flexible to adapt to environments that do not require such high levels of security. Security considerations shall be made on the following non exhaustive list of areas:

- User data confidentiality and integrity
- End-to-end security
- Secure notifications
- Firewall traversal
- Protection against malicious use of email (e.g. virus propagation)
- Protection against unsolicited messages (e.g. SPAM)
- No mandated storage (clear or encrypted) of email in transport network

5. Use Cases (Informative)

5.1 Use Case P2P / CORP, Receiving an Email on the go

5.1.1 Short Description

An email arrives at the email server of a mobile worker. The client on the terminal is made aware of the new email without excessive delay (based on preferences) and in a secure manner via notification or by fetching the event. We denote this as an event. Based on the preferences of the user, the event is made available to the user or the client that, once authenticated securely, accesses the new email or portions of it as needed (e.g., header, few first Kbytes, whole body without attachment or whole email). The mobile user experience of delay appears negligible (quasi-instantaneous) and they are at least comparable to desktop email. Events may include sending portion or all of the email; in which cases, no separate access step takes place. In addition, the client may receive the email event (a la notification) or fetch it. The use case is general enough not to presuppose a technology solution.

5.1.2 Actors

- The user of mobile email (e.g. employee)
- The owner of the email server (e.g. enterprise)

5.1.2.1 Actor Specific Issues

- The user of mobile email:
 - To receive new email (as desired as notification or full email) as soon as possible and in ways that appear quasi-instantaneous (i.e. as soon as possible after the email server receives the email).
 - To have his client react on the email event as set by preferences and based on the type of event
 - To be able to set preferences so that:
 - > Email are automatically accessed and stored (in totality)
 - > Portions of the email are accessed, e.g.:
 - = Information about the email (e.g. header, subject, sender, date, ...)
 - = A certain size
 - = Everything but attachments
 - > User may manually ask to access more of the email (as above in whole or in parts) if it has not already been totally stored in the client
 - > Email can be accessed when online or offline, e.g.:
 - = Browsing WAP / browsing
 - = Secure MMS /SMS actionable exchanges
 - = On the device when out of radio coverage
 - = Voice
- The owner of the email server:
 - To allow users to set preferences on what to do when a new email is received
 - To generate an event to inform the user / user client of the new email according to user preferences
 - To deliver email to the user according to the user preferences
 - To deliver the email in a manner is end-to-end secure
 - To allow the client / user to react accordingly to access and possibly download the email as specified by the user preferences (and possible server settings).

5.1.2.2 Actor Specific Benefits

- The user of mobile email:
 - Immediate notification or delivery of new email according to preferences
 - Can immediately act on the email
- The owner of the email server:
 - Enterprise:
 - > Increase in responsiveness of employees
 - > Increase in productivity
 - Service provider:
 - > Can provide secure “mobile email” experience and service to its customers

5.1.3 Pre-conditions

- The user of mobile email:
 - Has an account with email providers
 - Has a device with a client able to receive / access new email events
 - Support settings / preferences from the users or has hard coded ways to:
 - > Receive or access email events
 - > Access and possibly download email
 - Client is appropriately configured
 - Account is appropriately configured
- The owner of the email server (E.g. enterprise)
 - User has account
 - User preferences that affect the server are known
 - Knows how to provide access to email events, e.g.:
 - > what device
 - > device address
 - > Etc...

5.1.4 Post-conditions

- User is aware of the new email (to the extent set by his or her preferences) and has or can access it.

5.1.5 Normal Flow

- 1) Email arrives in the email server (goes into the inbox)
- 2) Email server generates an email event
 - This (and next step) may be based on user preferences / settings that influence how the event is generated
- 3) Email event is made available to the email client:
 - Via notification
 - Or by making event available for access by the client (e.g. for retrieval by the client)

- 4) Client reacts to the event possibly based on the preferences of the user (e.g. vibrate to announce event, display email sender / subject in inbox etc...)
- 5) Client checks preferences of the user
- 6) Client access the email and download the email as specified by the settings / preferences
- 7) Email is downloaded in whole or in part (depending on settings or preferences)
- 8) User can read / manipulate the email.

5.1.6 Alternative Flow

- 1) Step 3 may be skipped if the client performs traditional access to email in the meanwhile (i.e. email synchronization between client and server using appropriate email protocol (e.g. IMAP4rev1, POP3, webdav). For example, this could take place after establishing a dedicated connection with server (e.g. LAN or dial-up)).
- 2) Step 5 may be skipped if the client behaviour is hard coded (e.g. settings of client)
- 3) At step 6, the user may manually act on the event (to download, browse, ignore)
- 4) Step 7 may be replaced by graceful degradation to email via browsing, messaging or voice as discussed above (step 6/7 combined). As a result, the email may not be available offline at the difference of the other situations.
- 5) Step 7 may be iterated when the user wants to download more parts of an email.
- 6) Step 7 may consist of downloading the whole body but not the attachment.
- 7) Steps 5, 6 and 7 may be skipped if the event provides enough information about the email to the user.
- 8) Step 3 may be secure end-to-end or not (based on settings or preferences)
- 9) Step 6 and 7 may be end-to-end secure or not (based on settings or preferences)
- 10) Steps 3 and after may be delayed if device is not online

5.1.7 Operational and Quality of Experience Requirements

- Delays should be transparent to the user who should have the impression that the email or event arrives as soon that the email arrives to the email server
- Events and access should be secured or at least securable if desired by user, email server owner or settings of the client
- The flows above should work with email server behind a firewall
- The flows above should be supported on any target network technology including 2.5G, 3G and WLAN
- The solution should be able to handle devices that are temporary offline.
- Marking an email that was read on the mobile device as read in the user's enterprise mailbox

5.2 Use Case P2P / CORP, Receiving an email server event on the go

5.2.1 Short Description

An email event takes place on the server. For example:

- An email is deleted (e.g. via another client)
- A folder is created
- An email is moved to a new folder
- An email status is changed (read, unread, flagged, “has been replied to”, “has been forwarded to”, ...)

The client on the terminal is made aware of the event without excessive delay (based on preferences) and in a secure manner. Based on the preferences of the user (e.g. are deletions or moves on the server to be reflected on the clients, are folder structures beyond inbox present on the client etc...), the event is made available to the user or, the client reflects the event. The mobile user experience of delay appears negligible (quasi-instantaneous) and they are at least comparable to desktop email.

5.2.2 Actors

- The user of mobile email (e.g. employee)
- The owner of the email server (e.g. enterprise)

5.2.2.1 Actor Specific Issues

- The user of mobile email:
 - To receive server events as soon as possible and in ways that appears quasi-instantaneous (i.e. as soon as possible after the event takes place on the email server).
 - To have his client react on the email event as set by preferences:
 - > Typically without informing the user unless if a conflict must be manually resolved or an action must be checked by the user
- The owner of the email server:
 - To generate an event to inform the user / client of the server event.
 - To make available that event in a manner that is end-to-end secure, e.g.:
 - > Via notification (options for that will be discussed later)
 - > By making the event available for access by the user / client
 - To allow the client / user to react accordingly as specified by the user preferences (and possible server settings).

5.2.2.2 Actor Specific Benefits

- The user of mobile email:
 - Immediate reflection of server side events
- The owner of the email server:
 - Enterprise:
 - > Increase in responsiveness of employees
 - > Increase in productivity
 - Service provider:
 - > Can provide secure “mobile email” experience and service to its customers

5.2.3 Pre-conditions

- The user of mobile email:

- Has an account with email providers
- Has a device with a client able to receive / access new email events
- Support settings / preferences from the users or has hard coded ways to:
 - > Receive or access events
 - > How to act on the events
- Client is appropriately configured
- Account is appropriately configured
- The owner of the email server (E.g. enterprise)
 - User has account
 - User preferences that affect the server are known
 - Knows how to provide access to events, e.g.:
 - > what device
 - > device address
 - > Etc...

5.2.4 Post-conditions

- Client reflects the server event (to the extent set by his or her preferences).

5.2.5 Normal Flow

- 1) Email server event takes place (e.g. email is deleted from another client)
- 2) Email server generates an email event
 - This (and next step) may be based on user preferences / settings that influence how the event is generated
- 3) Email event is made available to the email client:
 - Via notification
 - Or by making event available for access by the client
- 4) Client reacts to the event possibly based on the preferences of the user (e.g. vibrates)
- 5) Client checks preferences of the user
- 6) Client reflects the event as specified by the settings / preferences
- 7) User can see impact of event on mobile email data.

5.2.6 Alternative Flow

- 1) Step 3 may be skipped if the server knows that the preferences of user or settings of the client are such that the event will not be acted upon or if the client performs traditional access to email in the meanwhile (i.e. email synchronization between client and server using appropriate email protocol (e.g. IMAP4rev1, POP3, webdav, ...)). For example, this could take place after establishing a dedicated connection with server (e.g. LAN or dial-up)).
- 2) Step 5 may be skipped if the client behaviour is hard coded
- 3) At step 6, the user may intervene to confirm or resolve conflict/uncertainties on the action to take in answer to the event
- 4) Step 3 may be secure or not

- 5) Steps 3 and after may be delayed is device is not online

5.2.7 Operational and Quality of Experience Requirements

- Delays should be transparent to the user who should have the impression that event arrives as soon that the events occurs on the email server
- Email events should be secured (e.g. encrypted) or at least securable if desired by user, email server owner or settings of the client
- The flows above should work with email server behind a firewall
- The flows above should be supported on any target network technology including 2.5G, 3G and WLAN
- The solution should be able to handle devices that are temporary offline.

5.3 Use Case P2P / CORP, Viewing email attachments on the go

5.3.1 Short Description

The user views attachments in ways adapted to his or her device.

5.3.2 Actors

- The user of mobile email (e.g. employee)
- The owner of the email server (e.g. enterprise)

5.3.2.1 Actor Specific Issues

- The user of mobile email:
 - To be able to view attachments on a mobile devices, adapted as needed to the device form factor and viewer capabilities
- The owner of the email server:
 - To allow users to view attachments
 - To adapt attachments to the needs of the device used by the user

5.3.2.2 Actor Specific Benefits

- The user of mobile email:
 - View attachments received with email
- The owner of the email server:
 - Enterprise:
 - > Increase in responsiveness of employees
 - > Increase in productivity
 - Service provider:
 - > Can provide its customers with the capability to handle attachments on their devices (e.g. view, download, edit, forward, save). As needed these attachments may first be adapted to the device characteristics and capabilities

5.3.3 Pre-conditions

- The user of mobile email:
 - Has an account with email providers
 - Has a device with a client able to access / view attachments
 - Support settings / preferences from the users or has hard coded ways to handle attachments
 - Client is appropriately configured
 - Account is appropriately configured
- The owner of the email server (e.g. enterprise)
 - User has account
 - User preferences that affect the server are known
 - Knows how to provide adapted attachments, e.g.:
 - > what device
 - > device address
 - > device characteristics (form factor) and document viewing capabilities
 - > Etc...

5.3.4 Post-conditions

- User can view the attachment on the devices

5.3.5 Normal Flow

- 1) An email with attachment arrives on the server for the user
- 2) The email is handled as described in section 5.1
- 3) Following 5.1, Email has been downloaded, but the attachment has not
- 4) User selects to view the attachment.
- 5) Client requests to download the attachment
- 6) Email server adapts the attachment to the:
 - Device form factor
 - Viewer capabilities
- 7) Client downloads attachment
- 8) User views attachment

5.3.6 Alternative Flow

- 1) The steps 5 to 7 may take place at step 3 if set so by user preferences or client settings
- 2) Steps 5 to 7 may be replaced by a request from the user to browse the document. In such case, the server adapts the document to the device form factor and browsing capabilities. As a result, the attachment may not be available offline.
- 3) Step 7 may take multiple iterations (where only portions of the attachment would be downloaded till the user requests for more).

- 4) Steps 2 and after may be delayed if device is not online

5.3.7 Operational and Quality of Experience Requirements

- Exchanges should be secured (e.g. encrypted) or at least securable if desired by user, email server owner or settings of the client
- The flows above should work with email server behind a firewall
- The flows above should be supported on any target network technology including 2.5G, 3G and WLAN
- For quality of the user experience, while downloading attachment, the client should provide indication of the download and if possible it should provide estimates of the time needed to download.
- The solution should be able to handle devices that are temporary offline

5.4 Use Case P2P / CORP, Sending emails on the go

5.4.1 Short Description

An email is composed by a mobile worker. Upon selecting to send the email, it is immediately securely sent from the email server of the user (and not another email server, e.g., an operator provided SMTP server). The composed email can include editing desired messages, attaching various files, re-editing any saved drafts, and so forth. After choosing to send the email, it is uploaded on the email server of the user and immediately and securely sent from the server. (And not another email server, e.g., an operator provided SMTP server).

5.4.2 Actors

- The user of mobile email (e.g. employee)
- The owner of the email server (e.g. enterprise)

5.4.2.1 Actor Specific Issues

- The user of mobile email:
 - To be able to send emails from mobile devices
- The owner of the email server:
 - To allow users to send email in a secure manner from the owner email server

5.4.2.2 Actor Specific Benefits

- The user of mobile email:
 - Can send email while mobile
- The owner of the email server:
 - Enterprise:
 - > Increase in responsiveness of employees
 - > Increase in productivity
 - > Send email from email server / corporate domain. This is important for:
 - = Audit / logging
 - = To control / monitor email sent by employees
 - = To certify source of emails

- = To satisfy legal requirements
- o Service provider:
 - > Can provide secure ways to send email its customers

5.4.3 Pre-conditions

- The user of mobile email:
 - o Has an account with email providers
 - o Has a device with a client able to compose and send emails
 - o Has a device with applications which can create, manipulate, and attach various attachments.
 - o Client is appropriately configured
 - o Account is appropriately configured
- The owner of the email server (e.g. enterprise)
 - o User has account
 - o User preferences that affect the server are known

5.4.4 Post-conditions

- Email sent by user has been sent from the email server (located in appropriate domain)

5.4.5 Normal Flow

- 1) User completes composition of an email on mobile email client, which includes:
 - o Editing a new desired message
 - o Attaching various files (document files, media files, fully or not fully downloaded files, etc.)
 - o Re-editing the saved draft
- 2) User selects to send the email
- 3) Client connects with email server and uploads the email
- 4) Email is sent from email server
- 5) Email may be saved in a sent folder (based on preference of user or behaviour/settings of email server)
- 6) Sent email in sent folder is reflected in email sent folder as in 5 (based on preference of user or behaviour/settings of email server).

5.4.6 Alternative Flow

- 1) Step 1 may be subject to DRM rules.
- 2) Step 7, may change with the email saved from the client reconciled with the server as in 5.5. Other flows may be considered.
- 3) The steps 5 to 6 may each be skipped if the user does not want to save sent email; that it be on the server or on the mobile client
- 4) Steps 3 and after may be delayed is device is not online. Based on settings or preference the email can be queued and sent as soon that the connectivity is re-established or the user may be prompted to confirm desire to send them.

5.4.7 Operational and Quality of Experience Requirements

- Exchanges should be secured (e.g. encrypted) or at least securable if desired by user, email server owner or settings of the client
- The flows above should work with email server behind a firewall
- The flows above should be supported on any target network technology including 2.5G, 3G and WLAN
- The solution should be able to handle devices that are temporary offline

5.5 Use Case P2P / CORP, Filtering rule changes while mobile

5.5.1 Short Description

While mobile, a user can change filtering rules that specify what, when and how emails arriving at the email server or email server events must be reflected or sent in the mobile email client.

5.5.2 Actors

- The user of mobile email (e.g. employee)
- The owner of the email server (e.g. enterprise)

5.5.2.1 Actor Specific Issues

- The user of mobile email:
 - To be able to change while mobile what email are to be sent/reflected to the client
 - To be able to change while mobile, what events should be sent to the client
 - To be able to change while mobile what events should be immediately sent to the client and what event can wait other scheduled synchronization between the client and the email server
- The owner of the email server:
 - To support changes while mobile of filtering rules on email / folder
 - To support changes while mobile of filtering rules on events / notifications

5.5.2.2 Actor Specific Benefits

- The user of mobile email:
 - Can change while mobile filtering rules on emails seen on the mobile email client
 - Can change while mobile filtering rules on events sent to client (which ones and when)
- The owner of the email server:
 - Enterprise:
 - > Increase in responsiveness of employees
 - > Increase in productivity
 - Service provider:
 - > Supports filtering rules
 - > Can provide management of filtering rules from mobile device to its customers

5.5.3 Pre-conditions

- The user of mobile email:
 - Has an account with email providers
 - Has a device with an appropriate email client
 - Client is appropriately configured
 - Account is appropriately configured
 - Has setup filtering rules as described in 5.6
- The owner of the email server (E.g. enterprise)
 - User has account
 - User preferences that affect the server are known
 - Filtering rules are known

5.5.4 Post-conditions

- Filtering rules have been changed (e.g. user is informed to expect an important email from somebody. He updates the filtering rules to immediately (immediate notification) of the email and to have the email reflected in the mobile email client)

5.5.5 Normal Flow

- 1) User decides to change a filtering rule
- 2) The new rule is transmitted to the email server

5.5.6 Alternative Flow

- 1) Step 2 may determine that the event does not have to be reflected to the client (e.g. a folder that does not have to be synchronized with the client or an email from a user that does not have to be sent to the mobile email client)
- 2) Step 2 may determine that while the event should be reflected, it can wait for normal synchronization to be performed later
- 3) Step 2 may be delayed if device is not online. Based on settings or preference the changes can be queued and sent as soon that the connectivity is re-established or the user may be prompted to confirm desire to send them

5.5.7 Operational and Quality of Experience Requirements

- Exchanges should be secured (e.g. encrypted) or at least securable if desired by user, email server owner or settings of the client
- The flows above should work with email server behind a firewall
- The flows above should be supported on any target network technology including 2.5G, 3G and WLAN
- The solution should be able to handle devices that are temporary offline

5.6 Use Case P2P / CORP, synchronization between clients

5.6.1 Short Description

The user can synchronize his email over the air as mobile email, using a pass through connection with another computer or client (e.g., cradle, Bluetooth, IRDA, over a direct LAN connection...).

5.6.2 Actors

- The user of mobile email (e.g. employee)
- The owner of the email server (e.g. enterprise)

5.6.2.1 Actor Specific Issues

- The user of mobile email:
 - To be able to synchronize over the air or through data synchronization over cradle (with laptop)
 - To be able to interrupt one mode and resume in the other
 - To maintain synchronized mobile email client, laptop email client and email server
- The owner of the email server:
 - To allow email server to synchronize with different clients
 - To allow clients to also synchronize among each others and still maintain consistency

5.6.2.2 Actor Specific Benefits

- The user of mobile email:
 - Can synchronize laptop over LAN or modem
 - Can synchronize the mobile email client and laptop client over cradle instead of over the air
 - Can then use client over the air as mobile email:
 - > Save cost of complete synchronization
 - > Allow use of mobile email client as a disconnected PDA when disconnected or on network that do not support mobile email
- The owner of the email server:
 - Enterprise:
 - > Increase in responsiveness of employees
 - > Increase in productivity
 - > Reduce cost
 - Service provider:
 - > Support different access models

5.6.3 Pre-conditions

- The user of mobile email:
 - Has an account with email providers
 - Has two devices with appropriate clients

- Clients are appropriately configured
- Account is appropriately configured
- The clients can synchronize data between each others
- For this example, one client use conventional email over IP (e.g. IMAP4 rev 1). It could also be using over the air mobile email. What matters is that the client can synchronize with the email server
- The owner of the email server (E.g. enterprise)
 - User has account
 - User preferences that affect the server are known

5.6.4 Post-conditions

- The two clients are synchronized with the email server

5.6.5 Normal Flow

- 1) First client synchronize with email server
- 2) User synchronizes second client to the first using data synchronization (e.g. OMA DS)
- 3) Second client synchronizes with email Server

5.6.6 Alternative Flow

- Step 1 can be interrupted before completion
- Step 2 can be interrupted before completion
- Step 1 can involve mobile email synchronization over the air or conventional email over IP (e.g. IMAP4 rev 1)
- Step 2 can involve data synchronization with the first client
- During step 2 the first client may be off line (synchronization is between the two clients) or online (the synchronization can be through the first client with the email server).

5.6.7 Operational and Quality of Experience Requirements

- Exchanges should be secured (e.g. encrypted) or at least securable if desired by user, email server owner or settings of the client
- The flows above should work with email server behind a firewall
- The flows above should be supported on any target network technology including 2.5G, 3G and WLAN
- The solution should be able to handle devices that are temporarily offline

5.7 Use Case Email with Attachment

5.7.1 Short Description

An email with an attachment arrives at the mail server of a user. Since the email has an attachment and based on the preferences of the user the server only delivers either all or some of the text part of the email.

5.7.2 Actors

- The user of mobile email
- The email system of the user

5.7.2.1 Actor Specific Issues

- The user of mobile email can:
 - Receive new email as soon as possible and in ways that appear quasi-instantaneous (i.e. as soon as possible after the email server receives the email).
 - Set preferences for:
 - > Automatic access and storage of emails on the device
 - > The Portions of the email that are to be stored on the device can be set
- The email system of the user on the email server:
 - To allow the user to set preferences so that upon receipt of a new email certain things will happen
 - To deliver email to the user according to the user preferences.
 - To deliver the email in a manner that is end-to-end secure.
 - To allow the user device / user to react accordingly to access and possibly download the email in a secure way as specified by the user preferences with or without attachment, complete or only partially (and not necessarily sequential, but with identifiable parts), and possibly rendered in multiple ways applicable for the device.

5.7.2.2 Actor Specific Benefits

- The user of mobile email:
 - Immediate delivery of new email according to preferences
 - Can immediately act on the email
- The owner of the email server:
 - Enterprise:
 - > Increase in responsiveness of employees
 - > Increase in productivity
 - Service provider:
 - > Can provide secure “mobile email” experience and service to its customers

5.7.3 Pre-conditions

- The user of mobile email:
 - Has an account with the enterprise
 - Has a client able to receive / access new email events
 - Has a client that can support settings / preferences from the users or has them hard coded, to:
 - > forward to other users and groups
 - > compose new email with selective parts of the received email
 - > etc.
 - Email client on users device is appropriately configured

- Account is appropriately configured
- The email system of the user
 - User has account
 - User preferences that affect the server are known

5.7.4 Post-conditions

Email is read without downloading first.

5.7.5 Normal Flow

The user receives an email with an attachment in his inbox. The mail service, based on the user's preference, delivers only the header of the message.

5.7.6 Alternative Flow

The user receives an email with an attachment in his inbox. The mail service, based on the user's preference, delivers only the header of the message. The user having read the header decides to download some more of the text. The user starts reading selectively the attachment.

5.7.7 Operational and Quality of Experience Requirements

- It should be possible to read email including attachments without first downloading entire email and attachments
- It should be possible to read selective parts of the email and attachments without first downloading entire email.

5.8 Use Case Forwarding Email without Downloading Attachments

5.8.1 Short Description

An email with an attachment arrives at the mail server of a user. Since the email has an attachment and based on the preferences of the user, the server delivers either all or some of the text part of the email. The user reads the text and forwards the message to other users with some additional text and an attachment without first downloading the original attachment

5.8.2 Actors

- The user of mobile email
- The email system of the user

5.8.2.1 Actor Specific Issues

- The user of mobile email can:
 - Receive new email as soon as possible and in ways that appear quasi-instantaneous (i.e. as soon as possible after the email server receives the email).
 - Set preferences for:
 - > Automatic access and storage of emails on the device
 - > Portions of the email that are to be stored on the device and forwarded
 - > Forwarding options
- The email system of the user:

- To allow the user to set preferences that upon receipt of a new email certain things will happen
- To deliver email to the user, according to the users preferences.
- To deliver the email in a manner that is end-to-end secure.
- To allow the user to react accordingly to access and possibly download the email in a secure way as specified by the user preferences.
- To allow the user to react accordingly to access and forward the email in a secure way as specified by the user preferences (and possibly server settings) without having downloaded the email

5.8.2.2 Actor Specific Benefits

- The user of mobile email:
 - Immediate delivery of new email according to preferences
 - Can immediately act on the email, such as forwarding
- The owner of the email server:
 - Enterprise:
 - > Increase in responsiveness of employees
 - > Increase in productivity
 - Service provider:
 - > Can provide a secure mobile mail experience and service to its customers

5.8.3 Pre-conditions

- The user of mobile email:
 - Has an account with the enterprise
 - Has a client able to receive / access new email events
 - Has a client that can support settings / preferences from the users or has them hard coded to :
 - > forward to other users and groups
 - > compose new email with selective parts of the received email
 - > etc.
 - Email client on users device is appropriately configured
 - Account is appropriately configured
- The email system of the user
 - User has account
 - User preferences that affect the server are known
 - Users email client processing capabilities

5.8.4 Post-conditions

Email is forwarded without downloading first.

5.8.5 Normal Flow

The user receives an email with attachment in his inbox. The mail service, based on the user's preference, delivers only the header of the message. Being out of the office he forwards the mail to his colleagues without first downloading the

attachments or the entire text to his device. The mail server forwards the original mail with attachments to the user's colleagues.

5.8.6 Alternative Flow

The user receives an email with attachment in his inbox. The mail service, based on the user's preference, delivers only the header of the messages. Having read the header he downloads some more of the text of the message and realizes some of the attachments are relevant to his team. Being out of the office he forwards the email to his team with some additional text and an attachment on how to deal with this matter, without first downloading the attachments to his device. The mail server appends the new text and attachment to the original mail and forwards the mail to his colleagues.

5.8.7 Operational and Quality of Experience Requirements

- It should be possible to forward email including attachments without first downloading entire email
- It should be possible to forward modified email including attachments without first downloading entire email.
- The forwarding uses the user's enterprise email address.
- The forwarded email is placed in the user's enterprise email Sent folder, and the email (that was forwarded) shows in the user's enterprise email Inbox marked to indicate that the email was forwarded.
- Marking an email that was read on the mobile device as read in the user's enterprise mailbox

5.9 Use-case: Configuring additional email accounts to be accessed

5.9.1 Short Description

A user wishes to configure his mobile-email client to access additional email accounts and merge the messages received from the different accounts. User is able to configure if merged messages are left on polled email server or removed.

5.9.2 Actors

- The user of mobile email
- The owner of the email server (e.g. mobile operator)
- The mobile operator (supplying the network)

5.9.2.1 Actor Specific Issues

- The user of mobile email:
 - To be able to receive emails on his mobile device from all of his email accounts
- The owner of the email server:
 - To allow users to receive email in a secure manner while on the move.
- The mobile operator
 - To allow the subscribers to receive satisfactory service using his mobile terminal.

5.9.2.2 Actor Specific Benefits

- The user of mobile email:
 - Gains access to all of his email messages, independent of the server location, while on the move

- The owner of the email server:
 - Supplies email messages to his users and increases his service satisfaction
- Service provider:
 - Customers use mobile email client for larger range of services

5.9.3 Pre-conditions

- The user of mobile email:
 - Has an account with email providers
 - Has a device with a client able to compose and send emails
 - Client allows user to configure additional mailbox accounts
- The owner of the email server (e.g. enterprise)
 - User has account
 - User preferences that affect the server are known
 - Allows client to connect to user's account based on authentication information

5.9.4 Post-conditions

- The Client is properly configured to access the messages in the additional email account

5.9.5 Normal Flow

- 1) User activates the mobile email client on his terminal
- 2) User chooses the configuration option of the mobile email client
- 3) User supplies the authentication information necessary for accessing the email account together with the protocol information for the email server.
- 4) User indicates if the messages retrieved from additional account should be merged into a single Inbox or separate folders should be displayed.
- 5) User defines whether polled messages are left on polled email server or removed.
- 6) User is given the option to define the filtering rules for the new account.
- 7) Client authenticates the access to the new email account and notifies user that configuration is complete.

5.9.6 Alternative Flow

None identified at this time.

5.9.7 Operational and Quality of Experience Requirements

- User should be presented with proper configuration options to allow friendly definition of the email accounts.
- Configuration should allow user to securely access all of his email accounts
- The flows above should be supported on any target network technology including 2.5G, 3G and WLAN
- The solution should be able to handle devices that are temporary offline

5.10 Use-case: Replying to messages that are retrieved from different accounts

5.10.1 Short Description

A user, who has configured his mobile email client to display messages from different accounts, wishes to send a reply message to a message that is displayed. When generating the reply the client should offer the user the capability to choose the “from field” which is used in the reply – to be either the original polled account “from field” or the main account “from field”.

5.10.2 Actors

- The user of mobile email
- The owner of the email server (e.g. mobile operator)
- The mobile operator (supplying the network)

5.10.2.1 Actor Specific Issues

- The user of mobile email:
 - To be able to distinguish between email accounts that his messages are retrieved from
 - To reply to his messages within the framework of the email accounts that the message was received at
- The owner of the email server:
 - To allow users to receive email in a secure manner while on the move.
 - To allow the users to conduct their email correspondence in a convenient manner
- The mobile operator
 - To allow the subscribers to receive satisfactory service using his mobile terminal.

5.10.2.2 Actor Specific Benefits

- The user of mobile email:
 - Is able to reply to messages received from different accounts while maintaining the integrity of his correspondence
- The owner of the email server:
 - Increased traffic of the email messaging
 - Supplies a reliable service to the users
- Service provider:
 - Customers use mobile email client for larger range of services

5.10.3 Pre-conditions

- The user of mobile email:
 - Has an account with email providers
 - Has a device with a client able to compose and send emails
 - Client allows user to configure additional mailbox accounts
 - Client allows user to generate reply messages to messages in the user's mailbox folders
- The owner of the email server (e.g. enterprise)
 - User has account
 - User preferences that affect the server are known
 - Allows client to connect to user's account based on authentication information

5.10.4 Post-conditions

- The reply message is sent to the originator of the original message from the email server originally addressed in a secure and private manner

5.10.5 Normal Flow

- 1) User activates the mobile email client on his terminal
- 2) User browses the messages in his inbox and selects a message to view.
- 3) User elects to generate a reply message to the message that he has selected
- 4) Client allows user to compose a new message that is a reply to the original.
- 5) Client identifies that email account that original message originates from and offers to send the message with the proper From: field
- 6) User chooses whether to retain this 'From:' field or change to another 'From:' account.
- 7) After composition is complete the user selects to send the reply message.
- 8) Email server for the account that is indicated by the From: receives the reply message and sends to the destination

5.10.6 Alternative Flow

None identified at this time

5.10.7 Operational and Quality of Experience Requirements

- User should be presented with proper configuration options to allow friendly definition of the email accounts.
- Configuration should allow user to securely access all of his email accounts.
- The flows above should be supported on any target network technology including 2.5G, 3G and WLAN
- The solution should be able to handle devices that are temporary offline

5.11 Open Issues

None identified at this time

6. Requirements (Normative)

Unless otherwise stated, all requirements apply to the mobile email enabler

6.1 High-Level Functional Requirements

Label	Description	Enabler Release
HLF-1	It MUST be possible to minimize delays and bandwidth requirements (e.g. by minimizing the number of roundtrips between client and server, the bytes to exchange between client and server, etc...) for the following: <ul style="list-style-type: none"> ▪ Events sent from the server to the client or accessed by the client to announce or describe new email ▪ Exchanges to deliver new email from the server to the client ▪ Events sent from the server to the client to announce or describe email events on the server ▪ Events accessed by the client from the server to announce or describe email events on the server ▪ Exchanges to reconcile the client after a email event on the server ▪ Exchanges to access or manipulate attachments ▪ Sending email from an assigned email server ▪ Sending email events on the client to the email server 	
HLF-2	The mobile email enabler MUST support both push (email events are pushed to the client) and pull (client accesses email events)	
HLF-3	The mobile email enabler SHOULD define a minimum set of interoperable media types and formats	
HLF-4	The mobile email enabler MUST support optimizations for wireless environments	

Table 1: High-Level Functional Requirements

6.1.1 Security

Label	Description	Enabler Release
SEC-1	The mobile email enabler MUST support integrity and confidentiality between client and server when exchanging data and event notifications	
SEC-2	Exchanges to provide new email arrived on server to the client MUST support confidentiality and integrity	
SEC-3	Exchanges to reconcile the client after an email event on the server MUST support confidentiality and integrity	
SEC-4	Exchanges to access or manipulate attachments MUST support confidentiality and integrity	
SEC-5	Exchanges to send email from the assigned email server MUST support confidentiality and integrity	
SEC-6	Email events sent from the client to the email server MUST support confidentiality and integrity	
SEC-7	The client MUST be able to be authenticated by the email server	
SEC-8	The email server MUST be able to be authenticated by the client	
SEC-9	The mobile email enabler MUST support content screening that provides protection from inappropriate email	
SEC-10	The mobile email enabler MUST support spam protection	
SEC-11	The mobile email enabler MUST support virus protection	

SEC-12	The mobile email enabler MUST support protection against denial of service (DoS) attacks	
SEC-13	It MUST be possible to prevent unauthorized applications from requesting emails to be sent from the mobile email client	
SEC-14	It MUST be possible to protect email data in the mobile email enabler from unauthorized access (user or device)	

Table 2: High-Level Functional Requirements – Security Items

NOTE: Confidentiality of the exchanges between the client and the server is only supported when mandated by the actors e.g. in the case of corporate email.

NOTE : (SEC-1 to SEC-9) Depending on the deployment model chosen by the Mobile Email Service Provider confidentiality and integrity will have to be supported either end-to-end between the email client and the email server, or only on that part of the network path between the email client and email server that is not trusted by the Mobile Email Service Provider.

6.1.2 Charging

Label	Description	Enabler Release
CHRG-1	In order to support charging for email traffic, the mobile email enabler SHOULD provide ways to identify mobile email exchanges (events, access, sending and synchronization) as email data exchanges, even when there is a secure connection between the client and server	
CHRG-2	In order to support charging for email traffic, the mobile email enabler SHOULD provide ways to identify mobile email data exchange characteristics (e.g. email message sizes, number of recipients, etc.), even when there is a secure connection between the client and server	

Table 3: High-Level Functional Requirements – Charging Items

6.1.3 Administration and Configuration

Label	Description	Enabler Release
ADMIN-1	It MUST be possible to provision the mobile email client, based on any combination of who the user is and what the device is	
ADMIN-2	It SHOULD be possible for user preferences/filters/settings to follow the user across devices, when used sequentially	
ADMIN-3	It MAY be possible for user references/filters/settings to follow the user across devices, when used simultaneously	
ADMIN-4	Authorized principals MUST be able to configure the settings of the user preferences/filters/configurable settings for a particular user	
ADMIN-5	The mobile email enabler MUST support the deletion by a remote, authorized principal of email data on a mobile device	
ADMIN-6	The mobile email enabler MUST support administration of authorized users and devices	
ADMIN-7	It MUST be possible for a user to view, edit and reset settings of a mobile email client	

Table 4: High-Level Functional Requirements – Administration and Configuration Items

6.1.4 Usability

Label	Description	Enabler Release
USAB-1	The mobile email enabler SHOULD minimize event propagation delays and MUST NOT impose excessive delays	
USAB-2	The mobile email enabler SHOULD minimize delays in accessing email messages and MUST NOT impose excessive delays	
USAB-3	When downloading an attachment, the mobile email enabler MUST allow the client to be able to provide an indication of the estimated download time needed to complete the download of the attachment	
USAB-4	When network connectivity is available, emails SHALL be sent from the client to the email server according to user preference or client settings, if configurable	
USAB-5	When connectivity is not available or drops, the user MUST be able to compose the message and have it stored on the device	
USAB-6	When connectivity is re-established stored messages MUST be sent as soon as possible	
USAB-7	When network connectivity is available, email events on the client SHALL be sent to the email server according to user preferences or client settings if configurable	
USAB-8	When connectivity is not available or drops, email events on the client that may take place MUST be stored on the client until connectivity becomes available and then sent to the email server as soon as possible.	
USAB-9	The mobile email enabler MUST allow the user to set filtering rules based on <ul style="list-style-type: none"> ▪ Email header fields ▪ Mailbox folder options. ▪ Spam score. This is a non exhaustive list and for example only.	
USAB-10	The mobile email enabler MUST allow the user to change filtering rules on his mobile email client.	
USAB-11	The mobile email enabler MUST support: <ul style="list-style-type: none"> ▪ Different methods for notifying the client about new emails based on capabilities of the network ▪ The ability for the user to select the transport method based on the capabilities of the client and network (e.g. SMS, Push, MMS etc) ▪ The ability for the user to select if, when and how events are accessed by the client 	
USAB-12	The mobile email enabler MUST support the use of a number of different means to transport notifications this could include SMS, MMS, WAP Push, SIP Notification, UDP, in band, polled)	
USAB-13	The user MUST have control of the result of new email events on the client, e.g. the client could download: <ul style="list-style-type: none"> ▪ Meta-data only ▪ Portion of the email ▪ The whole email without attachment ▪ The whole email with attachment 	
USAB-14	The user MUST be able to manually initiate access to email that has arrived on the server but is not yet on the client	
USAB-15	The user MUST be able to manually access more email data when only a portion is stored on the client (e.g. more of the body, a specific attachment, more of a specific attachment, the rest of the body, the whole email with all attachments)	

USAB-16	Authorized principals MUST be able to select the ways that email events are sent to or accessed by the mobile email client and other email settings that may affect the server behaviour	
USAB-17	The mobile email enabler SHOULD NOT require repetitive actions by the user for robustness to intermittent or unreliable connectivity	
USAB-18	The mobile email enabler MUST enable the user to forward an email partially downloaded (e.g. without attachment) without having to download the remainder to the client	
USAB-19	The mobile email enabler SHOULD minimize the amount of information that a user must provide to provision an email client to access the assigned email server	
USAB-20	The mobile email client MUST allow the user to reply to an email partially downloaded without first having to download any part of the remainder of the email to the client. It SHOULD be possible to include all of portions of the original email whether downloaded or not in the reply message	
USAB-21	The mobile email client MUST allow the user to edit a partially downloaded email, for reply and/or forward and have the server send all the portions of the edited email while minimizing the amount of data that is sent to the server (e.g. sending the differences)	
USAB-22	When composing an email (replying to/ or forwarding) the mobile email client MUST be able to download all or portions of that email for editing and the resultant email data sent to the server SHOULD be minimized (e.g. sending the differences)	
USAB-23	The mobile email enabler MUST support selecting the account to which messages are submitted	
USAB-24	When replying to a list of addressees, the mobile email client MUST allow the user to edit the addresses without downloading or uploading the whole list of addresses and minimize the amount of data that is sent to the server	
USAB-25	The mobile email enabler SHOULD support multiple email accounts provided by the same or different service providers	
USAB-26	The mobile email enabler MUST support configuration of email account information for connection and filtering on a per-account basis	
USAB-27	The mobile email enabler SHOULD support definition of auto-reply messages for each filtered messages. Automatically generated replies SHOULD avoid mail loops (RFC 5321 and related RFCs)	
USAB-28	The mobile email enabler SHOULD support activation/deactivation of auto-reply from the client. Automatically generated replies SHOULD avoid mail loops (RFC 5321 and related RFCs)	
USAB-29	The mobile email enabler MUST support replying to messages by using the email account that the original message was received on.	
USAB-30	The mobile email enabler SHOULD support identification of the source email account of retrieved email messages	
USAB-31	The mobile email enabler MUST support the user ability to forward only a selection of the attachments of an email with attachments, without downloading the attachments to the client	
USAB-32	The mobile email enabler MUST provide mechanisms to access any desirable email part even when the email size is beyond the limit imposed on the size of the emails that can be delivered to mobile devices while remaining within the size constraints of the part to be downloaded	
USAB-33	The mobile email enabler SHOULD enable the user to recall an email message	
USAB-34	The mobile email user MAY receive notifications of a success or failure of a recall request.	

USAB-35	The mobile email enabler MUST be able to estimate the size of each individual attachment (s)	
USAB-36	It SHALL be possible to manually refresh the “inbox” to see if new emails have been received	
USAB-37	It SHALL be possible for an authorized principal to limit the refresh rate (accessing the inbox on the server to see if new emails have been received)	
USAB-38	The mobile email enabler SHALL be able to identify URIs in messages	
USAB-39	The mobile email enabler SHOULD notify end-users of any processing errors	
USAB-40	The mobile email enabler MAY support multiple devices simultaneously	

Table 5: High-Level Functional Requirements – Usability Items

6.1.5 Interoperability

Label	Description	Enabler Release
IOP-1	Data exchanges between the client and server, such as events, sending email, reconciliation, attachment manipulation MUST be compatible in the presence of intermediary network elements (e.g. firewalls, proxies) between the mobile email client and the users email servers	
IOP-2	When used, events sent from the server to the client to announce or describe new email MUST be network neutral	
IOP-3	When used, events accessed by the client from the server to announce or describe new email MUST be network neutral	
IOP-4	Exchanges to provide email arrived on server to the client MUST be network neutral	
IOP-5	Exchanges to reconcile the client after an email event on the server MUST be network neutral	
IOP-6	Exchanges to access or manipulate attachments MUST be network neutral	
IOP-7	It MUST be possible to send email from the email server assigned to the user (e.g. not another email server in another domain)	
IOP-8	Sending email from an assigned email server MUST be network neutral	
IOP-9	Sending email events on the client to the email server MUST be network neutral	
IOP-10	If multiple mobile email clients are synchronized with the mobile email server, the mobile email enabler MUST allow multiple-way synchronization between the mobile email server and all synchronized clients	
IOP-11	The email enabler MUST support server-side adaptation of attachment to the device user by user	
IOP-12	The server-side adaptation MUST be capable of being controlled by the client (e.g. with smart or intermediate clients)	
IOP-13	The design of the mobile email enabler specifications SHALL support interoperability with relevant email standards (e.g. IMAP4, PoP3 and SMTP)	
IOP-14	Server-side adaptation MUST preserve the ability of accessing email via other channels (e.g. via other email clients)	
IOP-15	Server-side adaptation MUST preserve the original emails and attachment stored in the email server	

Table 6: High-Level Functional Requirements – Interoperability Items

6.1.6 Privacy

Label	Description	Enabler Release
PRIV-1	The mobile email enabler MUST allow the mobile email client to be protected by the same privacy protection rules / solutions as applied on the server (e.g. filtering rules, privacy alert detections on outgoing email, read/unread notice interception)	
PRIV-2	The mobile email enabler MUST support the use of privacy tools that require user's confirmation before allowing some email events to take place	
PRIV-3	The mobile email enabler MUST comply with OMA Privacy document as applicable	

Table 7: High-Level Functional Requirements – Privacy Items

6.2 Overall System Requirements

Label	Description	Enabler Release
SYSREQ-1	The mobile email enabler MUST be robust enough to operate normally and useable when there is an intermittent or unreliable connection between the client and server	
SYSREQ-2	The mobile email enabler security (authentication, authorization, confidentiality, integrity) MUST operate and be usable in the presence of intermittent or unreliable connectivity (loss of connectivity, loss of network transport packets and reconnect)	
SYSREQ-3	The mobile email enabler MUST NOT rely on the storage of email data in intermediate systems outside the email server domain or the terminal. ¹	
SYSREQ-4	The mobile email enabler MUST permit scalable (e.g. to the number of users) end-to-end implementations	
SYSREQ-5	The mobile email enabler SHOULD allow optimized implementations on constrained devices (e.g. power consumption, CPU overhead, memory and storage requirements). See also OMA-RPT-ApplicationPerformance-v1-20031028-A for additional informative details	

Table 8: Overall System Requirements

¹ Note that this requirement does not prevent implementations or solutions to use intermediate storage. Also, note that transport and other transitory exchanges and manipulations of packets are not considered as cases of intermediate storage covered by this requirement.

Appendix A. Change History (Informative)

A.1 Approved Version History

Reference	Date	Description
OMA-RD-MobileEmail-V1_0-20110802-A	02 Aug 2011	Status changed to Approved by TP: OMA-TP-2011-0273-INP_Mobile_Email_V1_0_ERP_for_final_Approval

Appendix B. Additional Use Cases (Informative)

B.1 Use Case P2P / CORP, Client Email Events

B.1.1 Short Description

Changes (email events as in 5.2) performed by the mobile worker in his or her email client (e.g., deleting an email or moving it from one email folder to another) are properly reflected to the user mail box in the email server, as prescribed by the user. If configured as such, drafts should be saved either locally or on the server.

B.1.2 Actors

- The user of mobile email (e.g. employee)
- The owner of the email server (e.g. enterprise)

B.1.2.1 Actor Specific Issues

- The user of mobile email:
 - To reflect changes / actions taken on the client to the email server as prescribed by users preferences
- The owner of the email server:
 - To allow users to reflect changes performed on clients as prescribed by user preferences.

B.1.2.2 Actor Specific Benefits

- The user of mobile email:
 - Can reflect changes / actions taken on the client to the email server as prescribed by users preferences
- The owner of the email server:
 - Enterprise:
 - > Increase in responsiveness of employees
 - > Increase in productivity
 - Service provider:
 - > Provides synchronization between email clients and servers that reflects any changes made on the client or server to its customers

B.1.3 Pre-conditions

- The user of mobile email:
 - Has an account with email providers
 - Has a device with an appropriate email client
 - Support settings / preferences from the users or has hard coded ways to handle changes made on clients (e.g. are email deleted on client also deleted on email server)
 - Client is appropriately configured
 - Account is appropriately configured
- The owner of the email server (e.g. enterprise)
 - User has account

- User preferences that affect the server are known

B.1.4 Post-conditions

- User changes on the clients are reflected on the email server as prescribed by the user preferences

B.1.5 Normal Flow

- 1) User performs a change (e.g. reads an email that results into changing the read/unread status of the email)
- 2) If prescribed by user preferences or client settings, the change is sent to the email server
- 3) The email server reflects the changes

B.1.6 Alternative Flow

- 1) Step 2 and 3 may be skipped if set so by user preferences or client settings
- 2) Step 3 may involve checking user preferences or settings. These check may take place on client, on server or on both
- 3) Steps 2 and after may be delayed if device is not online. Based on settings or preference the events can be queued and sent as soon that the connectivity is re-established or the user may be prompted to confirm desire to send them.

B.1.7 Operational and Quality of Experience Requirements

- Exchanges should be secured (e.g. encrypted) or at least securable if desired by user, email server owner or settings of the client
- The flows above should work with email server behind a firewall
- The flows above should be supported on any target network technology including 2.5G, 3G and WLAN
- The solution should be able to handle devices that are temporary offline

B.2 Use Case P2P / CORP, Filtering Rules

B.2.1 Short Description

While mobile, a user can set filtering rules that specify what, when and how emails arriving at the email server or email server events must be reflected or sent in the mobile client.

B.2.2 Actors

- The user of mobile email (e.g. employee)
- The owner of the email server (e.g. enterprise)

B.2.2.1 Actor Specific Issues

- The user of mobile email:
 - To be able to set what email are to be sent/reflected to the client
 - To be able to set what events should be sent to the client
 - To be able to configure the events sent to the client i.e. what events should be immediately and what events can wait for other scheduled synchronizations between the client and email server
- The owner of the email server:

- To support filtering rules on email / folder
- To support filtering rules on events / notifications

B.2.2.2 Actor Specific Benefits

- The user of mobile email:
 - Can set filtering rules on emails seen on mobile client
 - Can set filtering rules on events sent to client (which ones and when)
 - Effective in reducing client burden
- The owner of the email server:
 - Enterprise:
 - > Increase in responsiveness of employees
 - > Increase in productivity
 - Service provider:
 - > Supports filtering rules
 - > Can provide management of filtering rules from mobile device to its customers
 - > Reduced load, both in memory and bandwidth

B.2.3 Pre-conditions

- The user of mobile email:
 - Has an account with email providers
 - Has a device with an appropriate email client
 - Client is appropriately configured
 - Account is appropriately configured
- The owner of the email server (E.g. enterprise)
 - User has account
 - User preferences that affect the server are known
 - Filtering rules are known

B.2.4 Post-conditions

- Filtering rules are applied

B.2.5 Normal Flow

- 1) Server event affects some emails (see 5.1 or 5.2)
- 2) Email server checks that the event should be reflected to client
- 3) Email server checks that the event should be sent to the client (instead of awaiting later access)
- 4) Event or email are reflected as described in 5.1 or 5.2

B.2.6 Alternative Flow

- 1) Step 2 may determine that the event does not have to be reflected to the client (e.g. a folder that does not have to be synchronized with the client or an email from a user that does not have to be sent to the mobile email client)
- 2) Step 3 may determine that while the event should be reflected, it can wait later normal synchronization

B.2.7 Operational and Quality of Experience Requirements

- Exchanges should be secured (e.g. encrypted) or at least securable if desired by user, email server owner or settings of the client
- The flows above should work with email server behind a firewall
- The flows above should be supported on any target network technology including 2.5G, 3G and WLAN
- The solution should be able to handle devices that are temporary offline

B.3 Use Case P2P / CORP, Replying or Forwarding to Emails 'On the Go'

B.3.1 Short Description

A user wants to reply to an email received on his email client.

B.3.2 Actors

- The user of mobile email (e.g. employee)
- The owner of the email server (e.g. enterprise)

B.3.2.1 Actor Specific Issues

- The user of mobile email:
 - To be able to send emails from mobile devices
- The owner of the email server:
 - To allow users to send email in a secure manner from their own email server

B.3.2.2 Actor Specific Benefits

- The user of mobile email:
 - Can efficiently reply to email while mobile
- The owner of the email server:
 - Enterprise:
 - > Increase in responsiveness of employees
 - > Increase in productivity
 - > Send email from email server / corporate domain. This is important for:
 - = Audit / logging
 - = To control / monitor email sent by employees
 - = To certify source of emails
 - = To satisfy legal requirements

- Service provider:
 - > Can provide secure ways to send email its customers

B.3.3 Pre-conditions

- The user of mobile email:
 - Has an account with email providers
 - Has a device with a client able to compose and send emails
 - Client is appropriately configured
 - Account is appropriately configured
- The owner of the email server (e.g. enterprise)
 - User has account
 - User preferences that affect the server are known
- The user has received an email that he wants to reply to or forward.

B.3.4 Post-conditions

- Email reply by user has been sent from the email server (located in appropriate domain)

B.3.5 Normal Flow

- 1) User decides to reply to an email (e.g. hits reply all)
- 2) User adds text and attachments to the reply.
- 3) User can modify forwarded email:
 - Edit
 - Remove attachments
- 4) User completes composition of an email on the mobile email client
- 5) User selects to send the email
- 6) Client connects with email server and uploads the email
- 7) Email is sent from email server
- 8) Email may be saved in a sent folder (based on preference of user or behaviour/settings of email server)
- 9) Sent email in sent folder is reflected in email sent folder as in 5.2 (based on preference of user or behaviour/settings of email server).

B.3.6 Alternative Flow

- 1) If whole email body or attachments have not been downloaded to the client, the client does not have to download the missing parts.
 - In such a case, at step 7, the server completes the body and attachments before sending and saving (step 8).
- 2) In case 1 above, the user can request additional parts of the body if he / she want to edit missing part (e.g. change text).

- In such a case, at step 7, the server completes the remainder of the body and attachments before sending and saving (step 8).
- 3) In case 1 above, the user can remove attachments without downloading them
 - In such a case, at step 7, the server completes the remainder of the body and attachments (without the “removed attachments”) before sending and saving (step 8).
- 4) If the list of address to reply to is long, the client truncates it at step 6.
 - In such a case, at step 7, the server completes the list of address to send the message to before sending and saving (step 8).
- 5) In case 4 above, the user can edit the list of users to reply to at step 3.
 - When determined appropriate, the client at step 6 sends the whole reply list or a truncated list with indications of the changes. In the latter case, at step 7, the server generates the list of address to send the message to before sending and saving (step 8).
- 6) The same flows can apply when forwarding an email.

B.3.7 Operational and Quality of Experience Requirements

- Exchanges should be secured (e.g. encrypted) or at least securable if desired by user, email server owner or settings of the client
- The flows above should work with email server behind a firewall
- The flows above should be supported on any target network technology including 2.5G, 3G and WLAN
- The solution should be able to handle devices that are temporary offline

B.4 Use-case: Configuring Auto-Reply Message

B.4.1 Short Description

A user wishes to configure his mobile-email client to automatically reply that he is unavailable. This may apply to messages that the user has filtered out from being downloaded to his client and only to certain accounts

B.4.2 Actors

- The user of mobile email
- The owner of the email server (e.g. mobile operator)
- The mobile operator (supplying the network)

B.4.2.1 Actor Specific Issues

- The user of mobile email:
 - To manage emails from his mobile device in all of his email accounts
- The mobile operator
 - To allow the subscribers to receive satisfactory service using his mobile terminal.

B.4.2.2 Actor Specific Benefits

- The user of mobile email:

- Manages his email in a convenient manner from a single terminal
- The owner of the email server:
 - Supplies email messages to his users and increases his service satisfaction
- Service provider:
 - Customers use mobile email client for larger range of services

B.4.3 Pre-conditions

- The user of mobile email:
 - Has an account with email providers
 - Has a device with a client able to compose and send emails
- The owner of the email server (e.g. enterprise)
 - User has account
 - User preferences that affect the server are known
 - Allows client to connect to user's account based on authentication information

B.4.4 Post-conditions

- The Client has properly configured auto-reply settings on the server

B.4.5 Normal Flow

- 1) User activates the mobile email client on his terminal
- 2) User chooses the configuration option of the mobile email client
- 3) User selects the option to set an auto-reply message.
- 4) User indicates the email account to apply the auto-reply message to.
- 5) User is given the option to define the filtering rules for the messages that auto-reply is to be applied to.
- 6) Client forwards the setting to the appropriate email server.

B.4.6 Alternative Flow

None identified at this time

B.4.7 Operational and Quality of Experience Requirements

- User should be presented with proper configuration options to allow friendly definition of the email accounts.
- Configuration should allow user to set options in a friendly and usable manner.
- The flows above should be supported on any target network technology including 2.5G, 3G and WLAN
- The solution should be able to handle devices that are temporary offline