

DRAFT

IP Messaging

White Paper

Scope

This paper defines a vision for the evolution of mobile messaging services, leading to the deployment of Internet Protocol (IP) based messaging using the SIP/SIMPLE protocol and implemented on the IP Multimedia System (IMS). The vision is driven by the need to simplify the current complex user experience which results from the use of different messaging services. It is also important to offer an improved messaging solution which will stimulate conversational communication between users and help to grow messaging revenues.

Operators are encouraged to use this white paper to provide a vision and framework to guide their own thinking on the development of IP messaging services. The paper can also be used to inform the discussion within the GSM Association on the development of inter-working frameworks.

Contents

<u>1</u>	<u>Background & Executive Summary</u>	3
<u>2</u>	<u>IP Messaging</u>	5
<u>2.1</u>	<u>Conversations drive revenues</u>	5
<u>2.2</u>	<u>Internet email, IM and SMS</u>	5
<u>2.3</u>	<u>Approach to Mobile Instant Messaging</u>	6
<u>2.4</u>	<u>Longer term simplification of user experiences</u>	7
<u>2.4.1</u>	<u>Presence is not a prerequisite</u>	7
<u>2.5</u>	<u>Simplification of operator architectures</u>	8
<u>3</u>	<u>User Experience</u>	9
<u>3.1</u>	<u>User invocation of services</u>	9
<u>3.2</u>	<u>Conversation dynamics in the network platforms</u>	10
<u>4</u>	<u>Migration and Inter-working Considerations</u>	11
<u>4.1</u>	<u>Interworking with SMS and MMS</u>	11
<u>4.1.1</u>	<u>Network implications</u>	11
<u>4.2</u>	<u>Inter-operator interworking</u>	11
<u>4.3</u>	<u>Interconnect to Internet Service Providers</u>	12
<u>5</u>	<u>Conclusions</u>	13

1 Background & Executive Summary

Messaging provides a vital part of operator revenues: For many operators, text messages using SMS form the major portion of non-voice revenues and in some markets can account for more than 25% of overall service revenues. Developing enhanced messaging services is of keen interest in order to sustain and grow such revenue streams; however this is being addressed in a piecemeal fashion without guidance from a longer term vision.

Increasing complexity in user experiences is holding back the messaging market development: Current architectures in mobile messaging involve deployment and operation of multiple messaging platforms. Whilst SMS revenues continue to grow, new messaging services with additional functionality are being introduced (e.g. Multimedia Messaging, Push-to-Talk, Instant Messaging etc.). This has caused high complexity of the overall messaging architecture which is based upon individual platform implementations for each service. This, in turn, causes a poor customer experience. Not only does this architectural approach present significant challenges to operators in terms of ongoing cost and manageability, there is a risk of limiting growth in revenues (and therefore weakening of business cases) due to confusing customer experiences. This arises from the growing number of ways by which messages can be exchanged on mobile devices with other users who have varying degrees of access to messaging services. The fragmented community of users with different messaging capabilities is holding back the potential to develop increased revenues.

Messaging conversations will drive growth in operator revenues, rather than individual messages: Sending a one-off message to a friend, or using SMS to order a pizza or book a taxi is not expected to drive anticipated growth in messaging revenues, and in some markets the growth in SMS traffic is already starting to slow down. However, if end-users can engage in sustained conversations with a friend or colleague using SMS or Instant Messaging, then this will increase usage and should enhance revenues.

Simple implementation of internet IM-based services is not the complete answer: There is increased support within the operator community for continuation of the sending-party-pays and paid-interconnect business models. However, the simple translation of internet Instant Messaging (IM) based user experiences using such models will not offer an all-inclusive mobile messaging experience as evidenced by the success of SMS, and is unlikely to be seen as a valued service for end users. Such an approach will not offer a migration path to simplified user experiences and operator architectures. In particular:

- The ability for end-users to engage in sustained conversations with people who do not have access to next generation messaging capabilities should be upheld and maintained. This is important in order to link in and extend the current SMS based user community, which is significantly larger than the community of IM users.
- Presence should be viewed as a *stimulator* for mobile messaging, not a *prerequisite*, such that those users without presence capabilities are not excluded from the messaging community.
- SMS/MMS interworking will result in IM users continuing to contribute to the network-effect¹ momentum experienced in text-based messaging which passed the critical mass some years ago. A standalone mobile IM community will take time to reach its own critical mass, and could conceivably never reach it if inter-provider interoperability and usability issues arise and the network effect of other services take over. Interworking with SMS/MMS virtually guarantees that IM-like user experiences will eventually dominate and go on to take on the current “value” of the maturing SMS market.

¹ The network effect is where the communication activity increases as a square law to the number of users who are connected. The more users that are reachable by any service, the more messages each user will send. This is also known as the n-squared effect.

Interworking of IM-based IP messaging platforms with SMS and MMS is very achievable in the short term: There are technical solutions to enable the new IM-based IP Messaging platforms to interwork with SMS and MMS users in the short term in order to support fully-inclusive and sustained messaging conversations across mobile operator user customer bases. Mobile operators should ensure that IM-based IP messaging implementations can be readily adapted to support this interworking. This interworking also needs to be supported across network operator boundaries, and in the case when users are roaming.

SIP/SIMPLE and IMS will provide the longer term basis for conversational messaging: Operators should look to medium and long term benefits in scalability, reliability and security of IP-based rich messaging services by evolving to messaging architectures based on SIP/SIMPLE and IMS. An evolution to an IMS platform can reduce much of the complexity of the current solutions based on multiple platforms and hence also improve the end user experience.

IP Messaging will support “Hubbing” as a potential platform for paid interconnect and settlement: Operators are already interested in possible implementation of bi-lateral paid interconnect and settlement models based on a “hubbing” concept. The deployment of a common approach to provide rich IP messaging services will facilitate the use of the hubbing model which could potentially also handle interconnection with the fixed internet IM and internet email user communities.

2 IP Messaging

2.1 Conversations drive revenues

The success of the telecommunications industry lies in its ability to provide a platform to fulfil the fundamental social need for humans to undertake valued conversations. Whilst currently, voice-based conversations are valued most of all, the growth in text-based conversations in recent years provides evidence of user value in engaging in non-voice conversations that are compatible with changes in human lifestyles, aided by developments in technology.

2.2 Internet email, IM and SMS

For the fixed communications industry the services used to support the majority of text-based conversations are those based on **Internet email** and **Instant Messaging (IM)**. In mobile communications it is services based on **SMS**. The breakout below lists some fundamental characteristics of these services and the features that have contributed to their popularity.

Internet email	Internet IM	Mobile SMS
Inbox in network	Transient dialogues	Inbox on phone - Highly personal & private
Highly referential - Inbox accessible anywhere - Large and persistent storage	Highly conversational - Conducive user interface - Immediate delivery	Highly conversational - Short messages - Near-immediate delivery
Universal reach - Service provider interworking	Social circle reach - Highly personal	Universal reach - Service provider interworking
Multimedia support - Richer messages - Container for conveyance	Enhanced by multimedia - More engaging conversations - Experience sharing	
	Enhanced by presence - Spontaneous conversations - Personalised expressions	Contacts list integration

The increase in availability and affordability of “always-connected” fixed-internet terminals with richer and more engaging user interfaces has caused spontaneous text-based conversations within social groups to shift from internet email to internet IM-based service, with email being used more as reference and persistent store for non-conversational messages.

In parallel, the uptake of mobile phones as a mass market product, together with the “always connected” nature of mobile phones has allowed users and groups to stay constantly in touch using SMS text communication.

2.3 Approach to Mobile Instant Messaging

As mobile terminals develop with more capable user-interfaces it is clear that the benefits of the fixed internet IM proposition can also be realised in mobile. The preferred short term approach is typically to implement mobile IM as a straight “cross-over” service; replicating most of the characteristics of internet based IM on the mobile device as a new and distinct messaging service alongside SMS, MMS, email, Push-to-Talk etc. This is underpinned by a provider interconnect and charging model that maintains the values and sustainability of existing SMS based services. This vertical approach to mobile IM service deployment as a copy of fixed internet IM typically retains the following service characteristics:

- Subscribed presence is a prerequisite for person-to-person conversations
- These rich conversations are limited to the community of users with access to (and subscription/provision to) mobile IM services
- IM is separate distinct messaging service with limited possibility of combination with other services to simplify the overall mobile messaging user experience

However, the success of SMS based services as a platform for person-to-person, text based conversations can, in large part, be attributed to quite the opposite characteristics in the usage model:

- Indication of presence is not required for person-to-person conversations to start and continue, communication with others is possible regardless of their current status.
- There is universal reach across the entire mobile customer base regardless of handset capability
- Text/SMS is a simple user experience forming the main basis for messaging conversations alongside richer messaging forms e.g. MMS, Push-to-Talk, Voice etc.

It is proposed that mobile operators should consider retaining these key features of highly conversational messaging in mobile IM deployments in order to accelerate the adoption of richer user experiences, whilst providing a clear migration path towards simplification of IP messaging services in the longer term.

In the short term this will require a “**decoupled**” approach (i.e. the ability to send messages in a fashion that is not dependent on presence indication) to the implementation of presence in IM services and platforms, and full **interworking with SMS and MMS platforms**.

2.4 Longer term simplification of user experiences

The adoption of this strategy in the short term gives rise to the possibility of simplification of user experiences in the longer term. Fulfilment of the need for person-to-person conversations in the foreseeable future will be satisfied through the ability to undertake voice and video calls, rich interactive messaging and email:

Simple voice and video conversations	IP Messaging conversations stimulated by presence	Mobile email
<p>Voice call</p> <ul style="list-style-type: none"> - Circuit switched - VoIP <p>Video call</p> <ul style="list-style-type: none"> -- Circuit switched - over IP 	<p>Text only</p> <ul style="list-style-type: none"> - SMS use case (inbox model) - IM use case (transient dialogues) <p>Text with added pictures</p> <ul style="list-style-type: none"> - MMS use case (inbox model) <p>Text with added voice</p> <ul style="list-style-type: none"> - Push-to-Talk use case - Audio sharing use case (VoIP) <p>Text with added audio/video</p> <ul style="list-style-type: none"> - Push-to-Video use case - IP video-call use case <p>Text with added files</p> <ul style="list-style-type: none"> - File sharing use case 	<p>View contents of an existing remote inbox</p> <p>Send message as if from existing remote inbox</p> <p>Add/view attachments in messages</p> <p>Notification of new messages when they arrive</p>

The table above shows that the current confusing array of existing or planned separate mobile messaging services could be arranged into a more simplified offering with three main service types. This provides possibilities for operators to absorb/subsume some of the existing messaging services into an IM-like user experience .

As an illustration: because of sheer scale in usage and revenues of SMS services today, it is extremely compelling for operators to offer “text” messaging in the classic inbox model that users know and use today, but within a user interface that also makes it possible for a more IM-like conversation with transient, “threaded” dialogues to occur. Similarly, with this approach it is also possible for operators to convert users from current MMS service propositions (take a picture, add a caption and send) into a more naturally conversational picture messaging experience that sits within an existing IM-like dialogue, or one that starts with a picture and continues as an IM-like dialogue.

2.4.1 Presence is not a prerequisite

The key aspect in this approach is that *presence is not a prerequisite for conversations to take place – it is a stimulator for new conversations.*

This is especially true in mobile messaging, where the contacts list (address book) in the phone plays a crucial role in enabling conversations to take place. In the fixed IM model the contacts list (buddy list) typically represents a more intimate set of social and professional relationships within which the user has conversations. The implied “handshake” that goes with subscribing to the presence information of another user who subsequently becomes a “buddy” in the fixed IM model is in marked contrast to the contact entries that are typically built up in mobile phone address books over time. The internet IM buddy list is *unlikely* to include entries for e.g. plumber, electrician, taxi firm or pizza delivery house, but the mobile phone contacts list *will*, in addition to numerous entries that characterise social and professional relationships in which voice and text conversations take place.

Also, the experience from early operator specific IM product launches in recent years has shown that creation and maintenance of separate contacts lists for additional messaging services on a phone presents a barrier to service adoption.

Conclusions, in order to ensure a good user experience:

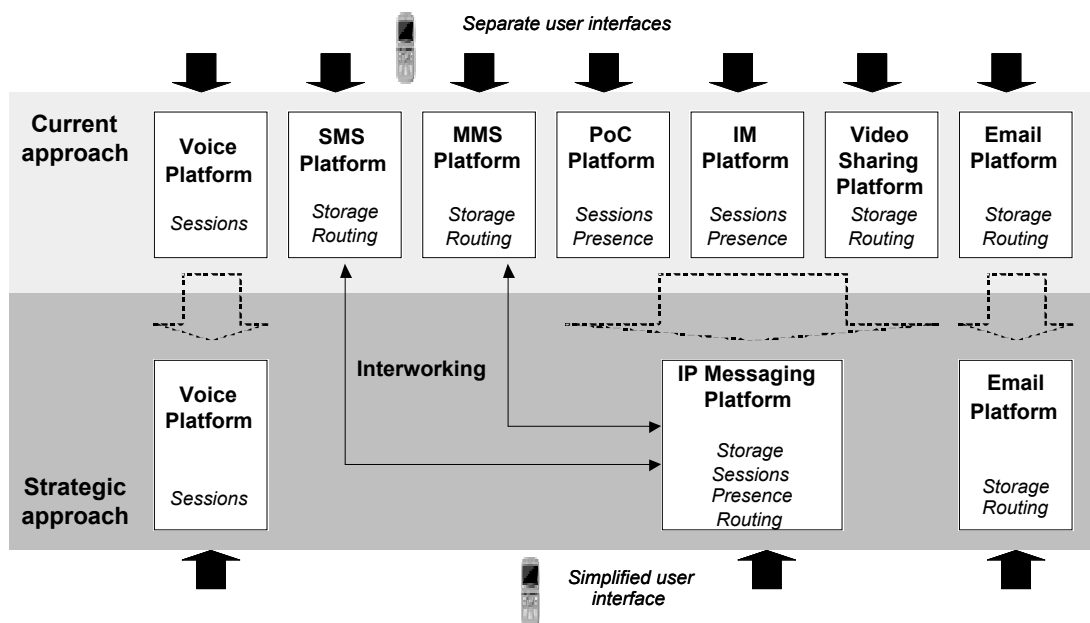
- Users should have to maintain only one contacts list in the phone
- Not all contacts in this list will represent “buddy” relationships, only a subset will
- Not all contacts in this list will possess phones with new IM-style user interfaces and services

Thus, not all new IM style conversations should be based on a contact’s presence, nor should conversations with them be dependent on their access to an IM style user interface

2.5 Simplification of operator architectures

The deployment of an IP Messaging platform that can support a more general and simplified model for conversational messaging provides a strategic basis for the future of the operator messaging platform architecture. Many operators now consider that the technologies used should evolve to SIP/SIMPLE protocols in an IMS network environment.

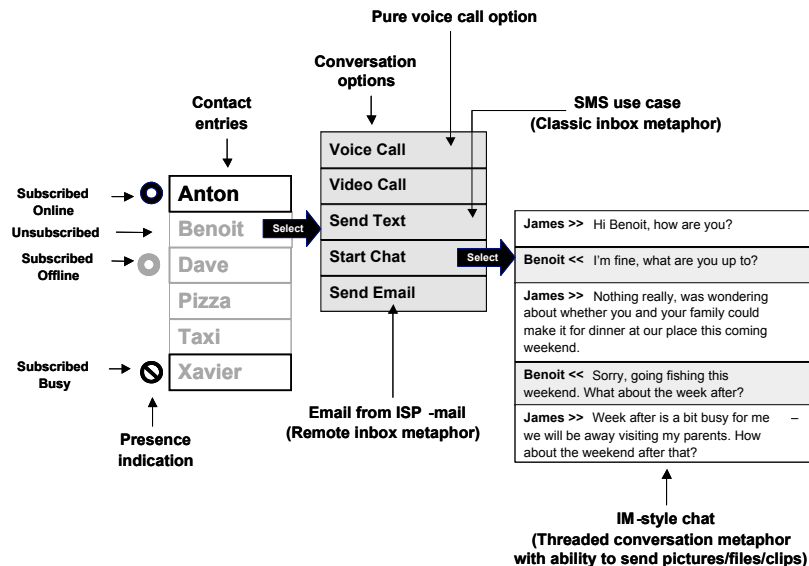
The short term interworking of this platform with SMS and MMS along with a decoupled presence capability provides a rational and practical migration path to this strategic architecture. As more and more users adopt the new, richer IM messaging experiences, the volumes of messages flowing through the legacy SMS and MMS platforms will decline over time, as existing and new messaging service propositions can be delivered within the IP messaging platform.



3 User Experience

3.1 User invocation of services

The basic model is that the user should be able to engage in communications services using the contacts-list as the starting point. A simplified set of options may look something like this:



In this example the operator makes available a simplified set of communications services upon selection of contact from the contacts list². The entries in the contacts list have presence indicators, indicating which contacts the user has subscribed to for presence indication, and of those, what the presence status is at that time. There may be contacts in the list for which the user has not subscribed to presence, either because the contact is not a “buddy”³, or the contact is not able to supply presence information due to not being in possession of the new rich IP messaging features on their phone⁴.

In any case, presence subscription, presence status and access to IP messaging on a remote contact’s phone does not limit the conversation opportunities available for the user.

In the above example, the contact called Benoit may or may not be using a phone which has the IP messaging capability, and James has not subscribed to Benoit’s presence but is equally able to undertake an IM-style conversation with him. If Benoit does not have a rich IP messaging capability on his phone, then he will view his side of the conversation as a series of messages from James in his classic SMS inbox, and if James sends a picture or audio clip as part of the conversation, then Benoit will receive them as MMS in the MMS inbox. From Benoit’s perspective, a conversation is taking place just as it always has done, but in James’ case the experience is a lot richer, more engaging, and with a better potential for sustained conversation.

What this example also demonstrates is that it is entirely feasible for the operator to make available a “classic” SMS product (“Send Text” in the picture above) which enables James to send a short message of 160 characters or fewer (for example to be charged at SMS product rates) if he so wishes, serving to illustrate the potential continuity of successful revenue-generating messaging products in a new all-IP world⁵.

² Ideally configurable “over the air”.

³ For example, the contact is the call centre number for a local taxi firm.

⁴ For example, the contact could have access to SMS and MMS only on their phone.

⁵ The SMS “product” is delivered over IP using the IP messaging platform, routing through the SMSC if required.

Conversation dynamics in the network platforms

The table below outlines the dynamics of the messaging in the cases where a user of rich IP Messaging capability has invoked the illustrated “Send Text” and “Chat” options on a contact in the contacts list of the phone. The user may or may not have subscribed to the remote contact’s presence information, or may not be able to due to the remote contact not having rich IP Messaging capability in his/her phone. In any case, the remote contact can either be **available** or **unavailable**:

- A rich IP Messaging user is considered **Available** in certain presence states e.g.
 - Self-declared “Online” or “Busy” or “On the phone” or “Having lunch” etc.
- A rich IP Messaging user is considered **Unavailable** in other presence states e.g.:
 - Self-declared “Appear Offline”.
 - Operator-determined “Offline” (e.g. phone known to be unattached).
 - Operator unknown (e.g. phone not communicating due to lost signal or ungraceful power down).
- A non-rich IP Messaging user who just has SMS and MMS capability on the phone ...
 - is considered **Available** if attached to the network.
 - is considered **Unavailable** if not attached to the network or unknown.

Conversing with remote rich IP Messaging User (Presence subscribed or not)		
Service Invoked	“Send Text”	“Chat”
Status of Remote Contact		
Available (Online, Busy, Lunching etc.)	<ul style="list-style-type: none"> • Send text message over IP. • Deliver immediately. • Message appears in remote contact’s “Text” inbox. 	<ul style="list-style-type: none"> • Send message over IP. • Deliver immediately. • Message appears in remote contact’s threaded dialogue view.
Unavailable (Offline, Appear Offline or Unknown)	<ul style="list-style-type: none"> • Send text message over IP. • IP Platform stores the message until the user becomes available or known. • Message eventually appears in remote contact’s “Text” inbox. 	<ul style="list-style-type: none"> • Send message over IP. • IP Platform stores the message until the user becomes available or known. • Message appears in remote contact’s threaded dialogue view.
Conversing with remote non-rich IP Messaging User (Presence not available)		
Service Invoked	“Send Text”	“Chat”
Status of Remote Contact		
Available (Attached to network)	<ul style="list-style-type: none"> • Send text message over IP. • Platform sends to SMSC. Deliver immediately. • Message appears in remote contact’s “Text” inbox. 	<ul style="list-style-type: none"> • Send message over IP. • If message is text only: <ul style="list-style-type: none"> - Platform sends to SMSC. - Deliver immediately. - Message appears in contact’s “Text” inbox • If message contains picture, audio or video attachment: <ul style="list-style-type: none"> - Platform sends to MMSC. - Deliver immediately. - Message appears in contact’s “MMS” inbox
Unavailable (Not attached to network)	<ul style="list-style-type: none"> • Send text message over IP to platform. • IP Platform sends to SMSC. • SMSC stores the message until user available. • Message appears in remote contact’s “Text” inbox. 	<ul style="list-style-type: none"> • Send message over IP. • If message is text only: <ul style="list-style-type: none"> - Platform sends to SMSC. - SMSC stores message until user available. - Message appears in contact’s “Text” inbox • If message contains picture, audio or video attachment: <ul style="list-style-type: none"> - Platform sends to MMSC. - MMSC stores message until user available. - Message appears in contact’s “MMS” inbox

4 Migration and Inter-working Considerations

4.1 Interworking with SMS and MMS

The interworking of a rich IP Messaging platform with existing operator SMS and MMS platforms is a realistically achievable adaptation of currently available IM platforms. The platform needs to have knowledge of which customers have access to the new IP Messaging capability. This can be achieved in a number of different ways:

- **Operator provisioning**
In this scenario the operator provisions the service in the network. A profile for the user is contained in a database (which could already exist⁶) and the operator messaging platforms reference this profile in order to determine how to send the message.
- **Dynamic detection**
In this case, the profile for the user is determined automatically based upon the type of handset that the user's SIM is detected within.

It is this knowledge of the messaging services available to the recipient that will determine whether the outgoing messages are delivered to the SMS or MMS platforms or not (for messages originating from a rich IP messaging user) or if the outgoing message should be forwarded to the IP messaging platform (for messages originating from a basic SMS and MMS user)⁷.

4.1.1 Network implications

It is clear that interworking with SMS and MMS is required in order to support migration to a sustainable IP messaging architecture. Such an implementation will involve consideration of the following:

- GGSN capacity to support increasing number of simultaneous PDP context activations.
 - Long-lived PDP contexts that re-establish themselves on disconnection.
 - Potential use of C7 SMS bearer as a "wake-up" mechanism by the IP Messaging platform in cases where PDP context not active.
- Impacts on (and evolution of) the radio system in terms of paging to support increasing use of presence.

4.2 Inter-operator interworking

The success of any messaging service is dependent on opening up the widest possible user community. This means that services must work across network boundaries in a consistent way, and that the services continue to work whilst users are roaming. Several steps will be needed to implement inter-operator interworking, as follows;

Step 1. The start point is the current interconnection and roaming capabilities for SMS and MMS services, including the use, as needed, of hubbing.

Step 2. Introduce interworking between initial IM implementations, this is likely to be needed as a pre-requisite for launch, or at least at very early in the product promotion phase. Such interworking will entail;

- Protocol conversion where different proprietary solutions are deployed by different operators, including agreement on which party carries out the conversion.
- Agreed principles for interworking between IM and SMS,
- Inter-operator presence interworking, including handling the SMS case
- Agreed inter-operator charging principles and account settlement

Step 3. Develop interworking based on SIP/SIMPLE protocol and SIP and IMS.

⁶ Potentially either the HLR or possibly a new database in the platform. In an IMS architecture likely to be the HSS

⁷ [Refer here to the standards paper that describes SMS/MMS interworking mechanisms](#)

4.3 Interconnect to Internet Service Providers

In addition to interconnection between mobile operators, the overall user community can be increased further by interconnection to internet service providers (ISPs), such as MSN. This allows mobile users to send IM messages to and from users who are logged on to one or more of the internet IM services. In practice, internet IM is characterised by several different IM protocols and currently comprises several different communities.

In the short term, interconnection with ISPs will require some form of interworking function, however, there is a possibility that the migration to SIP/SIMPLE protocol by mobile operators could provide a basis for a standard protocol to be used by both mobile and fixed internet service providers.

Because of the variety of protocols and the large number of internet service providers and mobile operators, a hubbing arrangement for interconnection may be the optimum solution. Such a hub can provide technical and commercial mediation between the mobile and ISP sides.

The possible steps for interconnect to ISPs are as follows:

Step 1. Introduce interworking between initial mobile operator IM implementations and ISPs. This is not seen as a pre-requisite for launch. Such interworking will entail;

- Protocol conversion where different proprietary solutions are deployed by different operators, including agreement on which party carries out the conversion.
- Agreed principles for interworking between mobile IM and internet IM,
- Agreed charging principles and account settlement between mobile operator and ISP.
-

Step 2. Introduce hubbing arrangements to assist in broadening the interconnection to the many different ISPs.

Step 3. Develop technically consistent interworking based on SIP/SIMPLE protocol, with connectivity via both bilateral and hubbing arrangements.

5 Conclusions

This paper has defined a vision for the evolution of mobile messaging services, leading to the deployment of Internet Protocol (IP) based messaging using the SIP/SIMPLE protocol and implemented on the IP Multimedia System (IMS). The vision is driven by the need to simplify the current complex user experience which results from the use of different messaging services. It is also important to offer an improved messaging solution which will stimulate conversational communication between users and help to grow messaging revenues.

The case studies demonstrate that it is entirely feasible for operators to make available an IM service which inter-works with SMS and which will maximise the user community and ensure an inclusive service. Capitalising on the existing SMS user base is seen as a critical success factor, rather than creating from scratch a new IM community.

Interworking between operators is needed and must offer a consistent user experience. Interworking with Internet Service Providers could also be important to maximise the user community by embracing users of fixed terminals. Such interworking is likely to be developed in a number of steps.

Operators are encouraged to use this white paper to provide a vision and framework to guide their own thinking on the development of IP messaging services. The paper can also be used to inform the discussion within the GSM Association on the development of inter-working frameworks.