MEF

FUTURE OF MESSAGING PROGRAMME

ENTERPRISE MOBILE MESSAGING GUIDE

EVERYTHING YOU NEED TO KNOW ABOUT
THE MOBILE MESSAGING SOLUTIONS
AVAILABLE TO YOUR BUSINESS

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EXECUTIVE SUMMARY

This guide has been developed by participants of the industry programme **Future of Messaging** from the Mobile Ecosystem Forum (MEF). It's an essential reference to help you make the most of the enterprise mobile messaging solutions available in the wholesale SMS market. Often called "A2P market" or "Application-to-Person market", A2P SMS provides a safe, efficient and cost-effective way to interact with your customers.

Sustaining a consumer focused and innovative communication channel requires continuous support to ensure technical, commercial and regulatory standards are maintained and as an industry - across the value chain - there is work to do to fully realise the goal to have an open and trusted communication channel to each and every consumer.

A complex global and multi-stakeholder ecosystem means there are different understandings of recommended business practices and diverse consumer protection legislation to consider. Similarly, misinterpretation or indeed worse - fraud and foul play - can hinder consumers' trust in the channel, slowing down adoption, impacting market potential and most importantly risking damage to your customer relationship.

MEF's Future of Messaging programme was established in 2015 to help drive best practice and market development for enterprise mobile messaging. This guide is designed as a comprehensive tool to help any buyer of enterprise SMS solutions to better understand the messaging ecosystem and make the most of this dynamic channel.

The guide helps you to:

- Navigate the enterprise mobile messaging industry and understand different roles of the stakeholder
- Articulate the essential features required by a mobile messaging solution
- Understand common technical, commercial and operational industry terms
- Ensure that the solutions you buy are legal and comply with industry regulations
- Identify messaging connections which are authorised for the delivery of enterprise messages
- Recognise the risks of buying solutions which make use of unauthorised connections to deliver your messages
- Make educated and informed decisions when choosing the right solutions for your business
- Avoid making common and sometimes costly mistakes

MEF FUTURE OF MESSAGING PROGRAMME

EXECUTIVE SUMMARY

Firstly, 'The Basics' explains who are the key stakeholders in the value chain and defines the common language used as well as the key features you need to look for when procuring an enterprise mobile messaging solution - legality & compliance, brand protection, deliverability, performance and price.

It also outlines the authorised routes that are industry qualified options to deliver messages to your customer:

- Option 1: National On-net
- Option 2: National Off-net
- Option 3: International Off-net
- Option 4: Via an MNO Group Hub
- Option 5: Via an MNO Exclusive Gateway Partner
- Option 6: Via an SS7 connection with an AA.60 Agreement in Place

The importance of this list relates to the fact that most fraud occurs in the final phase of the message delivery when compliance is overlooked or agreements breached and the responsibility to your customer disregarded. By using any of the six options outlined in the guide you can be reassured you are following best practice and able to assess service quality indicators to decide what is best for your business.

The guide also looks at the technical mechanisms which can sometimes can be identified and wrongly promoted as legitimate ways to deliver enterprise mobile messages to consumers. These include unauthorised routes such as

- Grey Route Bypass
- Rogue Aggregator Termination
- Rogue MNO Termination
- SIM Farms or SIM Box Bypass

Finally, the guide provides valuable advice when it comes to procurement including pricing, tiering of enterprise mobile messaging solutions and a useful set of business requirements when finalising provider contracts and master service agreements.

INTRODUCTION

As a means of establishing and maintaining a relationship with your customers, enterprise mobile messaging is unrivalled in both its ubiquity and its simplicity – one of the most common and accepted user experiences for any mobile consumer.

Analysts predict that the enterprise messaging market is expected to grow at a CAGR of 36% from US$ 17.2B in 2016 to US$ 58.7B in 2020, and from 1.6T enterprise messages sent in 2016 to 3.4T in 2020[1]. These are solid growth figures, that demonstrate businesses are increasingly developing communication processes and infrastructures that utilise SMS to reach their customers. This perception is backed up by research that shows that end-users – your customers – also prefer SMS to interact with their providers[2].

An enterprise mobile message, in the form of a "Short Messaging Service" or SMS, can range from a simple broadcast of a few characters to a more sophisticated two-way channel for more complex exchanges, all of which is made possible via a long-established infrastructure.

SMS has been adapted and further developed specifically for enterprise with great success by the mobile messaging industry. Enterprise mobile messages are generated by an application and used by businesses to communicate with their customers via mobile technology, supporting consumer engagement, customer care and support, marketing and the delivery of confidential and sensitive information, such as authorisation codes in the banking or tax sectors[3].

Even in areas with poor mobile network coverage which may prevent a quality voice call connection, an SMS will generally reach a mobile phone, be it feature phone or smart phone, anywhere in the world. It requires no advanced mobile technology nor a mobile data connection – it simply needs to be connected to a GSM network.

The very personal nature of a mobile phone accessed at high frequency on a daily basis means your customers are likely to see a message delivered via SMS more quickly than they would any other types of customer messages, such as emails. And more than just seeing its arrival, they will probably be reading it too as SMS messages have a 98% "open" rate, which is a significantly higher than the 20% for e-mail[4].

Different mobile messaging solutions are available to suit today's wide variety of enterprises and can be tailored accordingly. Mobile messaging is a particularly effective form of mass communication and the opportunity afforded by SMS for you to reach your customers worldwide is second to none.

INTRODUCTION

INTENDED AUDIENCE

This guide is designed to help any enterprise across multiple sectors, such as consumer brands, retail, logistics and delivery, financial institutions, governmental, health care providers, travel organisations, utilities and many more.

It is especially recommended for those in the following areas within an enterprise:

- Procurement
- Product, Marketing & Communications
- Logistics
- Sales & Business Development
- Compliance & Legal
- Technical

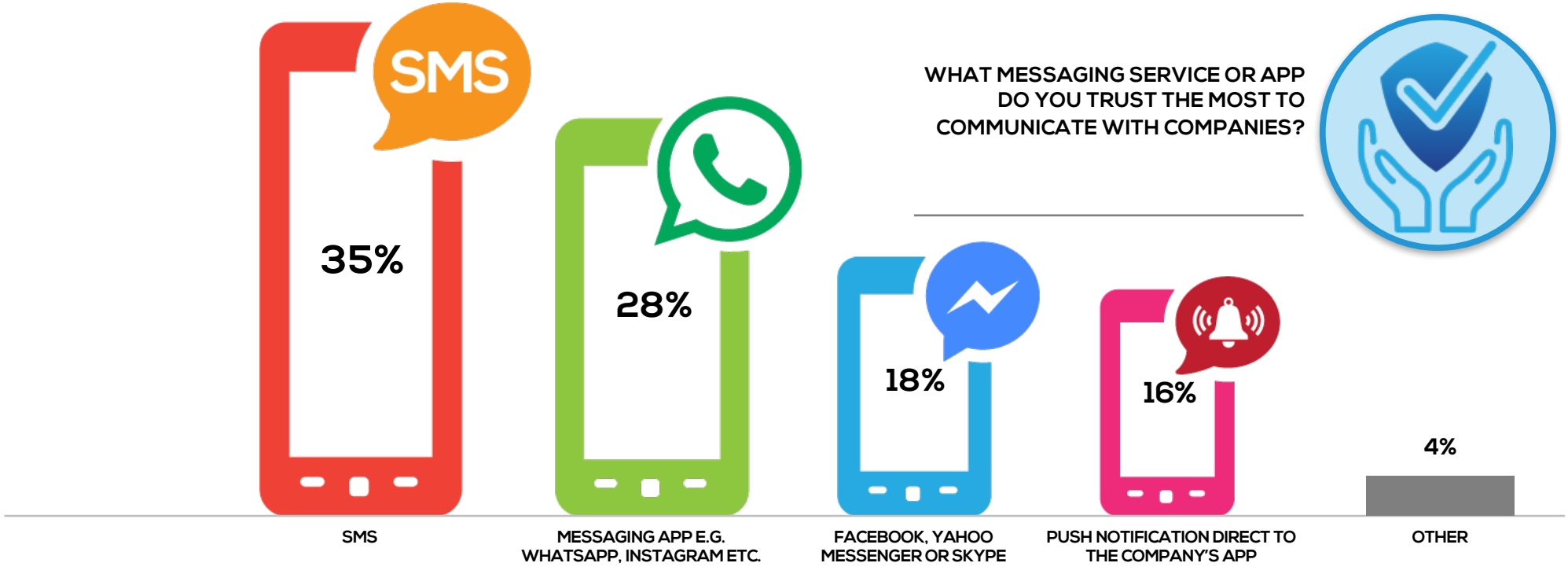


Chart: MEF Mobile Messaging Fraud Report 2016

THE BASICS

THE BASICS

WHO CAN I BUY AN ENTERPRISE MOBILE MESSAGING SOLUTION FROM?

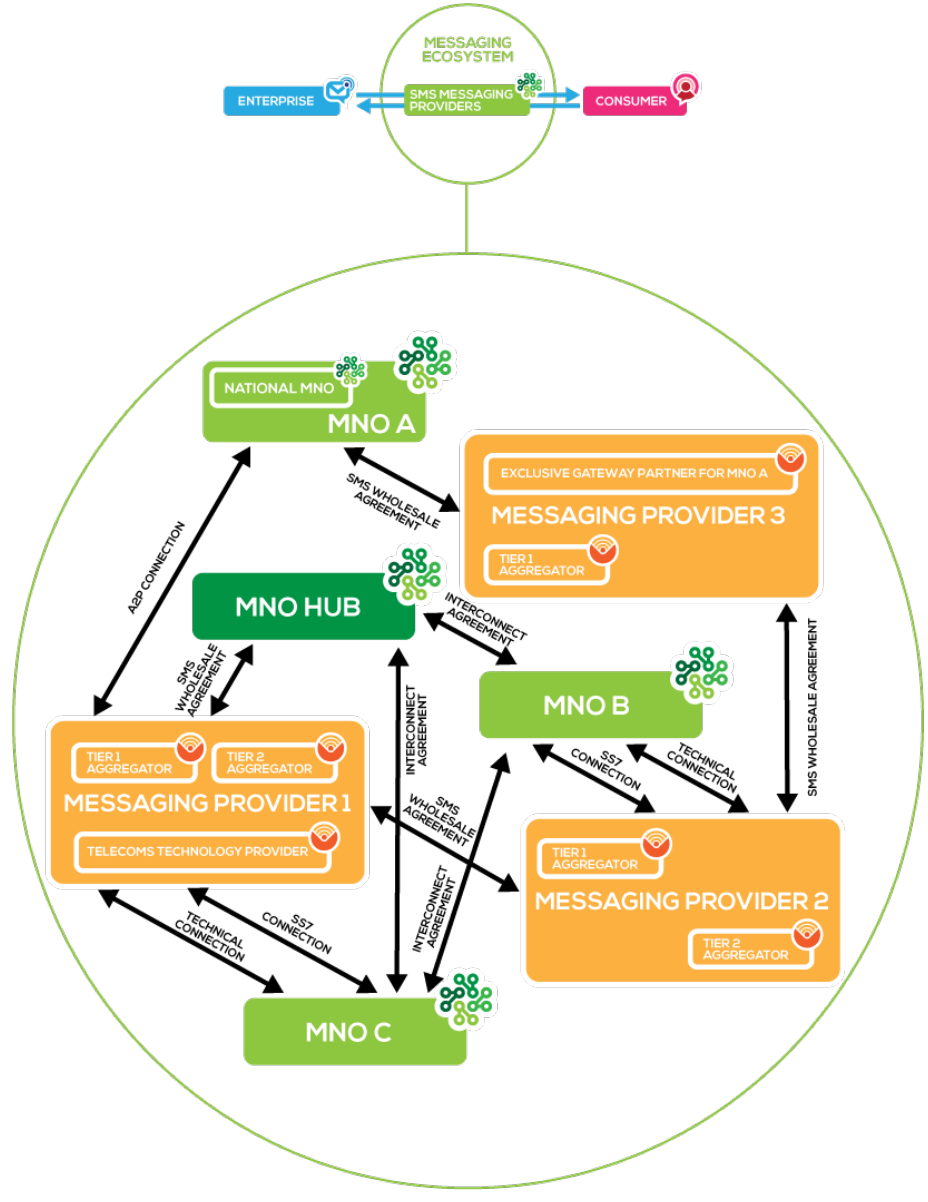
The providers of enterprise mobile messaging solutions are typically companies whose core business is one of the following:

- Mobile Network Operator (MNO)
- A2P SMS Aggregator or Aggregator
- Telecommunications Technology Provider (eg, SCCP Provider)
- Cloud Communications Provider

Any one of the parties listed above can be an enterprise mobile messaging provider ("Messaging Provider"), even if they have multiple technical or commercial roles. They simply need to be selling their solutions directly to an enterprise mobile messaging customer, namely, you.

A company becomes your messaging provider once you enter into a commercial agreement with them for the provision of an end to end enterprise mobile messaging solution for 'one-way' or 'two-way' delivery of messages between you and your customers.

As detailed later within the Guide, your messaging provider may or may not be contractually and technically linked directly to your customer's MNO. It is common practice for a messaging provider to enter into a contract with one or more other parties within the messaging ecosystem to build technical and commercial paths between you and your customers' mobile devices, as depicted here.



THE BASICS

EXPLAINING COMMON INDUSTRY LANGUAGE

Before explaining the essential features that you need to look for in a legal, authorised and reliable enterprise mobile messaging solution, we want to clarify some key industry terms. This will enable you to share a common language with your messaging provider and ask the questions that will secure the correct solutions for your business.

Please refer to the Glossary for a full list of industry terms and definitions.

- A CONNECTION or ROUTE
- AUTHORISED CONNECTION or ROUTE
- UNAUTHORISED CONNECTION or ROUTE
- DIRECT CONNECTION
- BLACK CONNECTION or ROUTE
- GREY CONNECTION or ROUTE
- A HOP
- A2P SMS AGGREGATOR or AGGREGATOR
- TIER 1 AGGREGATOR
- TIER 2 AGGREGATOR
- TIER X AGGREGATOR
- LATENCY
- THROUGHPUT
- AVAILABILITY

EXPLAINING COMMON INDUSTRY LANGUAGE

CONNECTIONS AND ROUTES

CONNECTION or ROUTE, the technical and commercial infrastructure which connects you to your customer for the delivery of messages. It can be viewed as a chain of often several links, each connected to the other, beginning with you and continuing all the way through to a terminating MNO, namely the MNO to which your customer is subscribed.

AUTHORISED CONNECTION or ROUTE, a route designated for the delivery of enterprise mobile messages,

- which is legal in all countries within which your message will travel, and,
- for which contracts are in place for reimbursement to all relevant parties for the handling of your messages

UNAUTHORISED CONNECTION or ROUTE, a route that does not conform to at least one of the conditions of an authorised connection or route.

DIRECT CONNECTION, a term which can often mislead as it means many things depending on who you ask. In its strictest sense, it describes a technical and commercial agreement which connects a messaging provider to a terminating MNO's enterprise messaging infrastructure using only standard telecoms protocols, ie, "I have a direct connection into MNO A – I have a contract with MNO A to send enterprise messages which are destined for their subscribers and my technical infrastructure is physically connected directly into MNO A's technical infrastructure"

However, the term is also used to describe a route to reaching an MNO, ie, "I have a direct connection into MNO A, via Provider 1". This route might be the most direct route available to you, but it should not be termed a direct connection as Provider 1 does not have a contract with and physical connection into MNO A.

The term direct connection is also sometimes used to refer to a situation in which a grey route is used to reach MNO A.

Another common example of its misuse concerns a connection into an MNO via the SS7 network which may or may not be authorised by the MNO. An SS7 connection describes technical connectivity with an MNO and not a situation in which a connection is established straight into MNO A's enterprise messaging infrastructure, supported by a contract.

To try and avoid any unnecessary complication, we avoid using the term 'direct connection' unless strictly necessary. We strongly recommend that you clarify exactly what your messaging provider means if they say that they are "connected directly to an MNO", ie, do they have a contact in place with the MNO to send enterprise mobile messages? Are they connected into the MNO's SMSC or via SS7? Are they offering the shortest authorised route to an MNO, etc?

EXPLAINING COMMON INDUSTRY LANGUAGE

CONNECTIONS AND ROUTES

BLACK CONNECTION or ROUTE, a route for which the delivery of enterprise mobile messages is illegal in at least one of the countries within which your message will travel.

GREY CONNECTION or ROUTE, a particularly important term as it is used extensively in the mobile messaging industry. A Grey Connection or Route is termed 'Grey' because while it may be legal, at least one party in the messaging delivery chain is not being reimbursed for their services.

Grey routes may sometimes appear attractive as they can be offered at a lower rate than authorised routes. However, this lower rate is made possible where the absence of a commercial agreement for a connection is exploited as a lower cost option at the expense of someone in the chain, often the terminating MNO.

It may not be obvious to you that the solution you have bought includes grey connections if your messaging provider is not transparent about the routes they are using to deliver your message, or perhaps if they genuinely do not know what connections are being used further down the chain. However, grey routes do pose a risk to your business which will be explained further in the Section: Unauthorised Routes.

EXPLAINING COMMON INDUSTRY LANGUAGE

HOPS & AGGREGATORS

A HOP, describes the point in a messaging delivery chain where a new party connects to the previous party. For example, if you are told that you can send messages to the subscribers of a specific MNO in a particular country via a "two-hop connection", it means that there are two parties between you and your customer, excluding MNOs.

A "zero-hop connection" is one in which a messaging provider and a terminating MNO have a direct technical and commercial agreement in place which establishes technical and commercial connectivity between each other's infrastructure.

Multiple hops mean multiple partners within the end to end delivery chain – this may be essential for some solutions, for example, when sending messages internationally, or even as a good option if cheaper authorised routes are available to you. But even if authorised, the performance of a route needs to be evaluated against your business requirements, as this guide will discuss in later sections.

A2P SMS AGGREGATOR or AGGREGATOR, a company that provides a route between you and one or more terminating MNOs. Aggregators are categorised by Tier (eg. Tier 1, Tier 2, Tier X) depending on how many hops away they are from the terminating MNO.

> Connection tiering is covered in the Section: Enterprise Messaging Procurement, but below is a description of each tier of aggregator:

TIER 1 AGGREGATOR, has a commercial, technical and operational relationship with your customer's MNO, meaning that they are the final partner in the end to end message delivery chain.

> For example, to deliver a message to a Telefonica O2 customer, a Tier 1 Aggregator in the UK is expected to have to have at least one technical, operational and commercial relationship directly with Telefonica O2.
>
> It might also have established alternative routes to reach Telefonica O2 via other messaging providers. It can choose any route from amongst its available alternatives, provided that they are all authorised, that this is transparent to you and that they meet your business requirements.

TIER 2 AGGREGATOR, has a connection to a Tier 1 Aggregator. The Tier 1 Aggregator gives the Tier 2 Aggregator contractual guarantees about the type of connection that will be used to deliver a specific category of message or to a particular destination. A Tier 2 Aggregator will pass a message onto their contracted Tier 1 Aggregator partner on the understanding that the Tier 1 Aggregator is delivering the message in accordance with the contractual terms.

> Please note that contracts throughout the messaging delivery chain should be back to back, or your requirements may not be reflected further down the chain.

TIER X AGGREGATOR, will not have a contract directly with a terminating MNO, but will have contracts with a range of Tiers of Aggregator. A Tier X Aggregator is likely to have less control over the selection of connections used further down the messaging delivery chain.

> Again, please note that contracts throughout the messaging delivery chain should be back to back from beginning to end or your requirements may not be reflected further down the chain.

EXPLAINING COMMON INDUSTRY LANGUAGE

TECHNICAL FEATURES

LATENCY, generally speaking, is the time taken for a message to get from point A to point B.

- The lower the end to end latency, the faster a message will travel between you and your customer.
- As a component within the end to end message delivery process, latency can be affected by the inclusion of additional partners in a chain
- Where multiple partners are engaged, each partner can only assure the latency within their link of the chain
- The terminating MNO will define latency as the time taken from the acceptance of a single SMS into its SMSC to the point that it reaches the subscriber's phone
- Latency also increases with the presence of different parameters and infrastructure, for example, the technology used, the location of recipients (national or international), delivery to subscribers of multiple MNOs, the volume of messages to be delivered or special character features such as currency symbols, etc

Example: Latency has the most significance for the delivery of time-critical and often sensitive information such as One Time Passwords (OTP), Banking PINs and Two Factor Authentication (2FA) messages.

When buying: Clarify whether 'Latency' is being used to describe the latency of the entire delivery chain, or the latency within the specific section of the delivery chain that your messaging provider controls and how the inclusion of additional partners in the chain is likely to affect end to end latency. Make sure that your messaging provider has back to back contracts in place to meet the latency requirements that you have.

EXPLAINING COMMON INDUSTRY LANGUAGE

TECHNICAL FEATURES

THROUGHPUT, the capability that an MNO or messaging provider has to carry a certain volume of messages across their infrastructure within a certain unit of time. Throughput is usually measured by the number of SMS per second, eg. 300 SMS per second.

- This is a key parameter for the delivery of large volumes of messages at once. It usually varies depending on destination and price.
- Throughput is generally offered on a scalable basis rather than as a flat maximum value and where the conditions to change the limits and how to enforce them should be defined contractually.
- The aggregate throughput available on a route is subject to the capacity of all of the partners engaged in the provision of a messaging solution, ie. the partner in the chain which can carry the lowest volume of messages will define the actual throughput available within the end to end solution.
- MNOs often set throughput limits, for example, 10 to 20 SMS per second as a default and will increase this for a limited period if given advanced notice that a large campaign requires a higher throughput.

Example: A business wanting to remind customers about an end of season sale would need to consider a connection which offers a high volume and scalable throughput.

When buying: Clarify whether 'Throughput' is being used to describe what your messaging provider can guarantee end to end, whether this is flat or scalable, and whether they are describing the maximum throughput that they offer under ideal circumstances or the maximum throughput available within the solution you require based on different parameters. Clarify how the inclusion of additional partners in the chain is likely to affect end to end throughput.

As with latency, make sure that your messaging provider has back to back contracts in place to meet the throughput requirements you have.

If relevant to your business, you may want to explore different options to achieve higher throughput, for example, in some cases, an SS7 connection with an MNO may provide a higher throughput.

EXPLAINING COMMON INDUSTRY LANGUAGE

TECHNICAL FEATURES

AVAILABILITY, describes the reliability or 'uptime' of a route in terms of the percentage of time that a connection is fully operational within a specified period of time

- For example, a route marketed with an availability of 99.0%, within a period of 30 days a month, 24 hours a day and 60 minutes an hour, is expected to be unavailable 1% of the time, roughly 430 minutes each month (7 hours and 12 minutes). 99.99% availability within the same period would mean an expected downtime of roughly 4 minutes per month. The level of reliability you need will be determined by your business needs.
- Redundancy is the term used for a failover connection which assures the continuity of services in the event of connection failure. It dramatically improves the availability of a connection.
- Some messaging providers may build redundancy into a messaging solution and charge for a premium service.
- Some messaging providers may refer to availability in terms of dates and times when enterprise messages will not be sent. For example, in order to comply with specific regulations, messages may not be sent outside of standard business hours in some countries.

When buying: Clarify the specified level of availability or uptime of a route – both percentage and time period – and whether redundancy is built into the price of a messaging solution.

THE BASICS

ESSENTIAL FEATURES

An understanding of the essential features of all enterprise mobile messaging solutions will address the most common questions buyers ask:

- How long will it take for messages to reach my customers?
- How many messages can I send at once?
- Can I reach any customer, at any MNO?
- Which countries can I send messages to?
- Will my customers be able to reply to me?
- Can I measure message open and conversion rates?
- Are there any specific rules that I need to be aware of?
- How much will it cost me?

LEGALITY & COMPLIANCE

BRAND PROTECTION

DELIVERABILITY

PERFORMANCE

PRICE

ESSENTIAL FEATURES

LEGALITY & COMPLIANCE

- The delivery of enterprise messages is subject to regional and/or country-specific legislation and regulations which may be imposed by a national legislator or a regulatory authority.
- Non-compliance, whether negligent or deliberate, can result in the immediate suspension of a service by an MNO, the permanent loss of messages somewhere along the route, or even enforcement action by the relevant enforcement agency.
- Requirements or restrictions may relate to:
  - Technology, eg. in Brazil it is a federal crime to use SIM Boxes to send enterprise messages
  - Geography of the connections, ie. if your customer's personal data may not go outside national borders
  - Geographical source of messages, ie, complying with rules which govern the delivery of international messages into specific countries
  - Time of delivery, ie, many countries prohibit the sending of enterprise mobile messages outside of standard business hours
  - Permitted content, ie, national legislation may prohibit the sending of certain content, such a political or religious content - your messaging provider should be able to filter and block content which is not permitted in certain countries
- In addition to regional and/or country-specific requirements, enterprise messaging is further regulated through a number of agreements, issued by the GSMA, which establish contractual and commercial protocols between originating MNOs, terminating MNOs and messaging providers for the delivery of messages, named AA agreements, such as AA.60. AA agreements define the conditions permitted by an MNO for the delivery of messages into their network, in terms of volume, technology, platforms used, etc. They offer a means of establishing whether a specific connection is authorised or not.

BRAND PROTECTION

- Brand damage and consumer harm is a real risk if data protection and security are not properly managed.
- At best, not properly managing your customers' personal data or overzealous marketing could mean that your messages, however well-intentioned, are classed by your customer as spam, or are not correctly delivered.
- At worst, weaknesses in end to end data security, or the involvement of partners within a delivery chain who are unknown to you could result in data being handled by companies which are not authorised by you or your customers to do so, and also leaving you vulnerable to data theft.

ESSENTIAL FEATURES

DELIVERABILITY

- No messaging provider can legitimately offer a 100% guarantee that every message sent will reach your customer.
- Naturally complex routes, those which contain multiple partners, or the type of connection a Tier 1 Aggregator selects to send your message to your customer can impact on delivery success and increase the risk of messages being delayed, lost or even deleted.
- The quality and reliability of the authorised connections available to different messaging providers is key to a high end-to-end deliverability ratio, ie, reliability of your messages travelling successfully from A to B.
- Some deliveries may be delayed or may fail for reasons outside of the control of your messaging provider. For example, if your customer's phone is turned off or if they are without any mobile network coverage, a message may be delayed until the handset can be located. If the handset cannot be located for an extended period of time, for example, after three days, a message may fail completely.

PERFORMANCE

- How long will it take for messages to reach my customers? For example, an authentication message requires a higher prioritisation and faster delivery time than an end of season marketing campaign message. You may want to set prioritisation criteria and maximum time frames within which different categories of message must reach a recipient, namely, message latency.
- How many messages can I send at once? You need to ensure that your messaging provider is able to process the volumes you want – the throughput – to send in one go without the need for messages to be queued until there is space in their systems to send them. Queued messages can lead to delayed delivery or messages 'expiring', namely, being out of time before they leave your messaging provider's systems.
- What is the delivery rate of my messages, namely, the success delivery ratio of my solution? For example, out of 100 messages, what number have been successfully delivered?
- Are my messages being displayed in the way I have designed them to be, for example, does the currency symbol display correctly on my customers' handsets? Correct formatting is essential for your customer to be able to view a message as intended. Unwanted or unauthorised connections increase the odds of distorting your message and your intended format might be lost.

ESSENTIAL FEATURES

PRICE

- Enterprise messaging is a low cost and effective way to interact with your customers. However, as in any other service industry, all parties within the messaging ecosystem require reimbursement for their work.
- Most notably are the termination fees or rates, namely, the price charged to terminate your message at the final link in the messaging delivery chain. These fees or rates may be commercially negotiated between a messaging provider and an MNO as with any other agreement, but they tend to be regulated on a country by country basis and also by individual MNOs, including the imposition of fixed values, maximum caps and minimum thresholds.
- The level of a termination fee defined by an MNO can influence the price at which a messaging provider may offer different solutions and pricing models and fees will therefore vary.
- An obvious consequence is that the delivery of messages to different countries will mean different prices, with some quite significant differences in some cases. A good indication of the legality of a solution is to compare the price you are negotiating with your messaging provider against the termination fees applicable in a certain country or that offered by the terminating MNO, the MNO to which your customer is subscribed. If the price you are being offered is below the set rate for a country, the solution probably includes elements which are unauthorised.

AUTHORISED ROUTES

AUTHORISED ROUTES

THE AUTHORISED WAYS TO SEND ENTERPRISE MOBILE MESSAGES

To be able to reach a customer using an enterprise mobile message, you need to reach the MNO to which your customer is subscribed. Your message may have hopped via different parties once it leaves your messaging provider, but it will eventually be delivered to your customer's mobile phone by their MNO, which is known as 'terminating' a message.

Listed here are the six authorised ways in which a message can be terminated, namely, delivered to your customer by their MNO in accordance with all relevant contractual, legislative or regulatory conditions which apply.

As already stated, it is common practice for a messaging provider to enter into a contract with one or more other parties within the messaging ecosystem to deliver a solution. Your messaging provider may therefore be one or more hops away from the terminating MNO. The tiering of connections is discussed in the Section: Enterprise Messaging Procurement.

The options listed here concern only the final link in the messaging delivery chain which connects a messaging provider to a terminating MNO, ie, that there is no hop between you or your messaging provider and the terminating MNO outside of the SS7 network. It is at this point that some of the most common breaches occur.

It is important to note that a message can be terminated by authorised means in more than one way. Provided that your customer's MNO formally allows the delivery of your message via some commercial mechanism, the following connections are all authorised for the delivery of enterprise messages. The choice of which one to use can then be made on the basis of criteria such as performance or price.

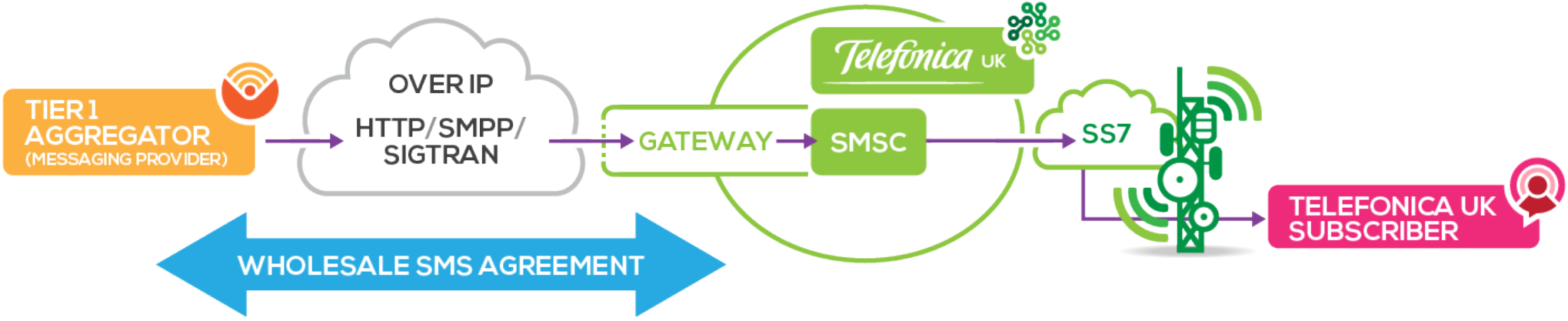
OPTION 1:	NATIONAL ON-NET
OPTION 2:	NATIONAL OFF-NET
OPTION 3:	INTERNATIONAL OFF-NET
OPTION 4:	VIA AN MNO GROUP HUB
OPTION 5:	VIA AN MNO EXCLUSIVE GATEWAY PARTNER
OPTION 6:	VIA AN SS7 CONNECTION WITH AA.60 AGREEMENT IN PLACE

THE AUTHORISED WAYS TO SEND ENTERPRISE MOBILE MESSAGES

OPTION 1: NATIONAL ON-NET

Description: This is when an MNO terminates a message to their own subscriber.

Example: You or your messaging provider want to send a message destined for a Telefonica UK subscriber and send it through a connection to Telefonica UK to terminate the message.

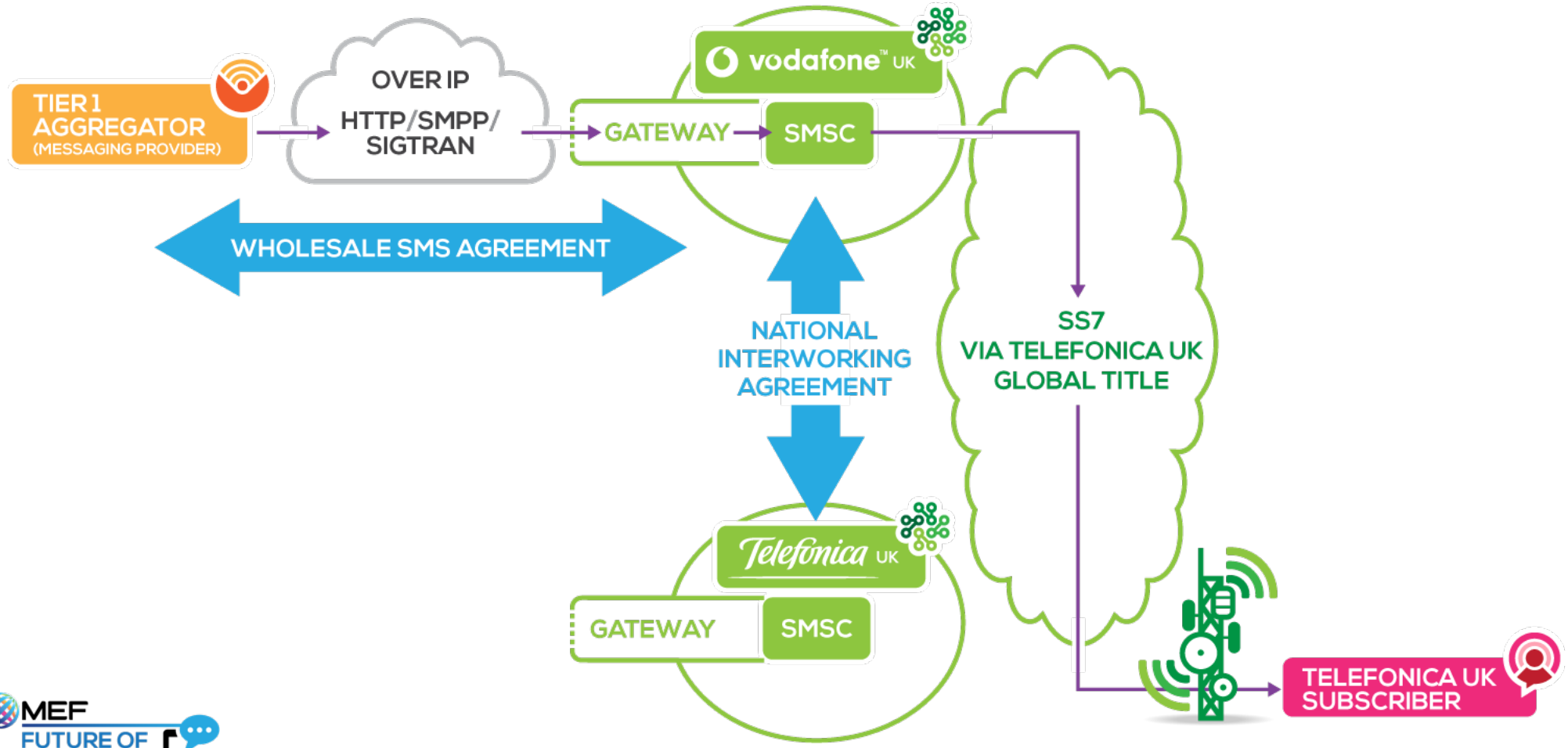


THE AUTHORISED WAYS TO SEND ENTERPRISE MOBILE MESSAGES

OPTION 2: NATIONAL OFF-NET

Description: This is when an MNO terminates a message to another MNO's subscriber in the same country. A commercial agreement, also known as an interworking or interconnection agreement, exists between the two MNOs which permits the delivery of enterprise mobile messaging and ensures that the subscriber's MNO is reimbursed for delivering the message.

Example: You or your messaging provider have a message destined for a Telefonica UK subscriber and it is sent through a connection to Vodafone UK to terminate the message.

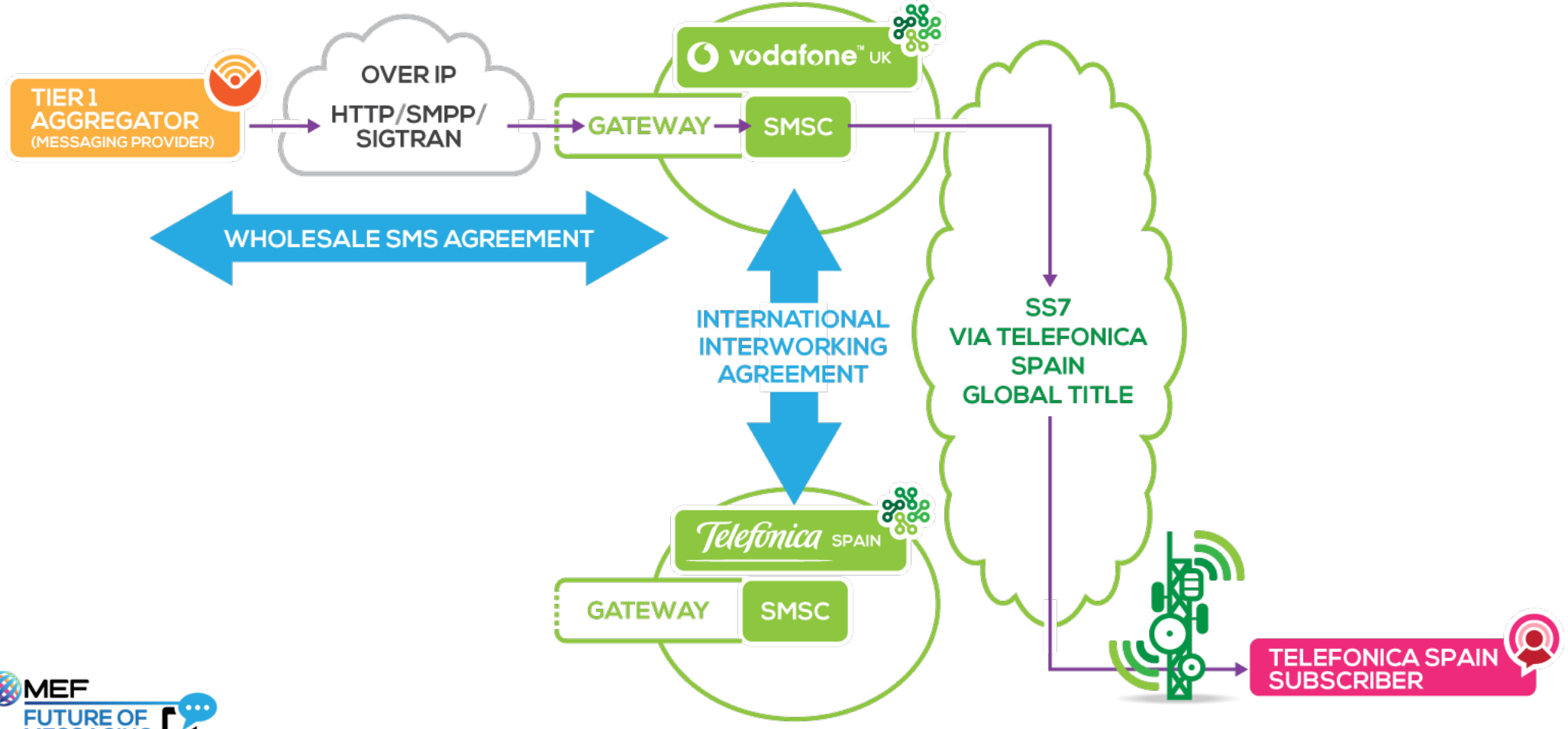


THE AUTHORISED WAYS TO SEND ENTERPRISE MOBILE MESSAGES

OPTION 3: INTERNATIONAL OFF-NET

Description: This is when an MNO terminates a message to another MNO's subscriber but where the terminating MNO to which your customer is subscribed is in a different country. An interconnection agreement exists between the two MNOs which permits the delivery of enterprise mobile messaging and ensures that the subscriber's MNO is reimbursed for delivering the message.

Example: You or your messaging provider have a message destined for a Telefonica Spain subscriber and it is sent through a connection to Vodafone UK to terminate the message.

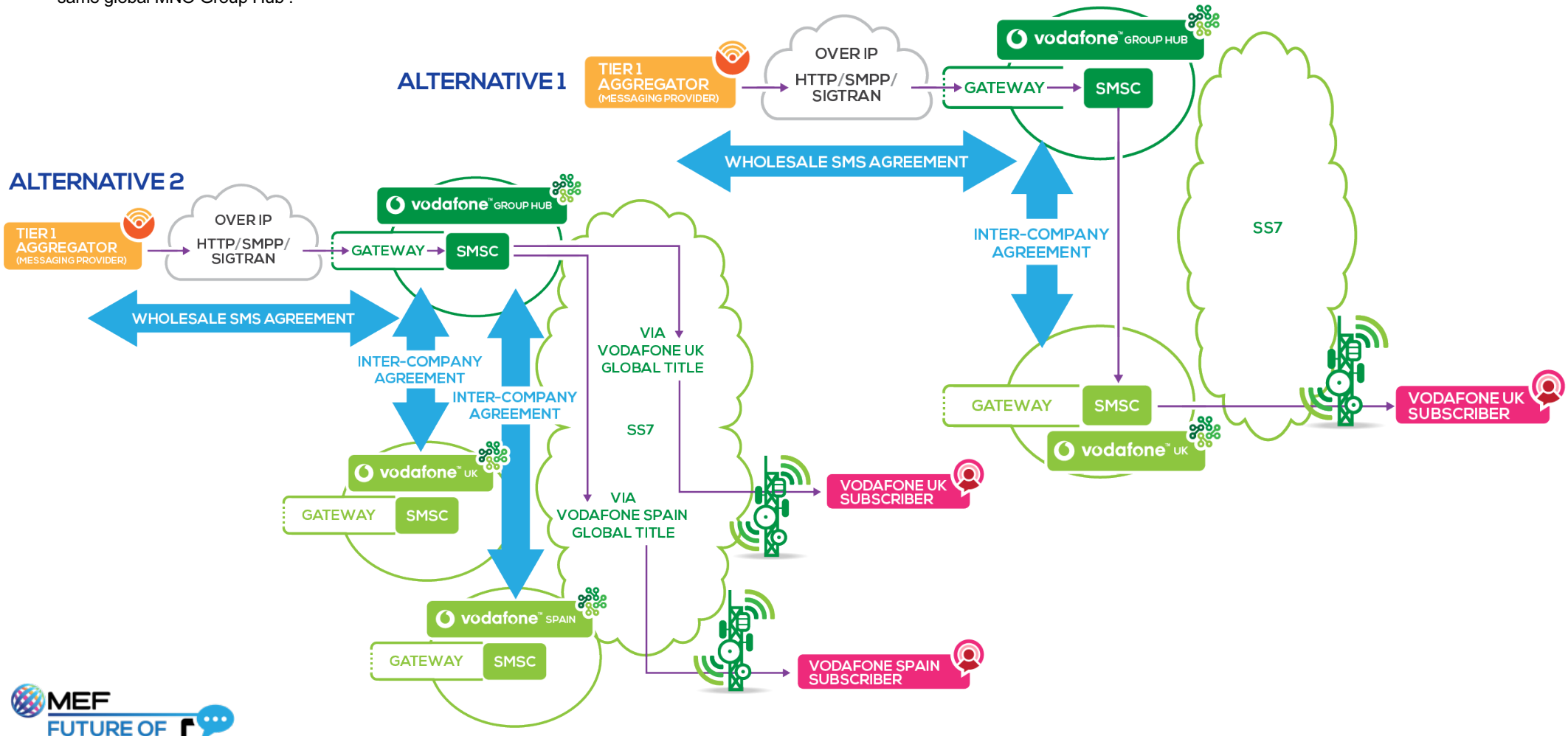


THE AUTHORISED WAYS TO SEND ENTERPRISE MOBILE MESSAGES

OPTION 4: VIA AN MNO GROUP HUB

Description: This is a route made available via a formal interconnection agreement which permits enterprise mobile messaging between a national MNO in one country and the same national MNO in a second country, both of which are members of the same global MNO Group Hub*.

Example: You or your messaging provider have a message destined for a Vodafone Spain subscriber and it is sent through a connection to the Vodafone Group Hub in the Netherlands to terminate the message. See Alternative 2 below.



*Please note that is not the same thing as sending a message via a P2P Hub. An MNO Hub is an enterprise-ready option and not a hack to an MNO's infrastructure.

THE AUTHORISED WAYS TO SEND ENTERPRISE MOBILE MESSAGES

OPTION 5: VIA AN MNO EXCLUSIVE GATEWAY PARTNER

Description: This connection is made available by an MNO via an exclusive gateway company. This occurs when an MNO does not have the required infrastructure or expertise in-house to launch an enterprise mobile messaging service themselves and instead outsources this to another company. This will sometimes occur in conjunction with Firewall companies offering to protect an MNO's network for the right to be the Exclusive Gateway Partner. MNO Exclusive Gateway Partner status may also be assigned to an aggregator or to an MNO Group Hub which performs the role of aggregating messaging traffic.

A messaging provider which is connected to an MNO Exclusive Gateway Partner is classed as a Tier 1 Aggregator as the Exclusive Gateway Partner provides the only authorised way to send messages to a specific MNO.

Please note: this option should not be confused with the situation which applies in some countries whereby international traffic must be delivered via a domestic Tier 1 Aggregator, in which case, the international messaging provider is classed as a Tier 2 Aggregator. Such requirements may be imposed by a national regulator or by an MNO mandating that any new enterprise mobile messages are routed via one of their established domestic Tier 1 Aggregators.

Example: You or your messaging provider have a message destined for a Telkomsel subscriber and it is sent to Telin which is Telkomsel's Exclusive Gateway Partner for international messages destined for their subscribers in Indonesia.

THE AUTHORISED WAYS TO SEND ENTERPRISE MOBILE MESSAGES

OPTION 6: VIA AN SS7 CONNECTION WITH AN AA.60 AGREEMENT IN PLACE

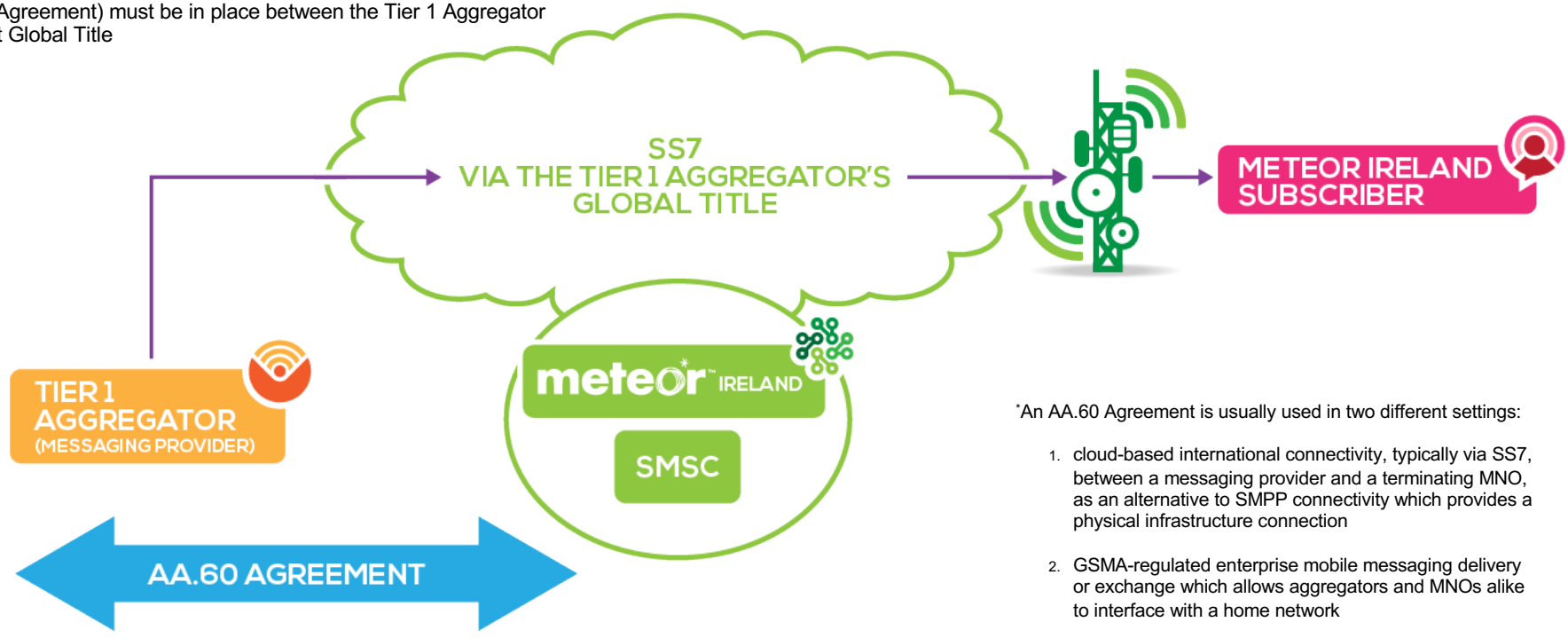
Description: This option is authorised only when formally set up and agreed by an MNO via an AA.60 Agreement. A Tier 1 Aggregator will use their own Global Title and SMSC to terminate a message and deliver it via SS7. This option may sometimes be formally agreed for technical reasons but is generally applied when a terminating MNO does not have a wholesale enterprise mobile messaging (A2P) team or SMPP Gateway and prefers to use their normal roaming or interconnect department to connect to partners within the message delivery chain correctly*.

When properly authorised, it is wholly dependent on the following all being in place:

- A Tier 1 Aggregator terminates a message to a subscriber using their own SMSC
- The Tier 1 Aggregator has provisioned the SMSC using their own Global Title
- The Global Title must be issued by a recognised regulator
- An AA.60 (or AA.19 Agreement) must be in place between the Tier 1 Aggregator and the MNO for that Global Title

Please note: this option should not be confused with unauthorised bypass which is discussed in the Section: Unauthorised Routes.

Example: Your messaging provider has a message destined for a Meteor Ireland subscriber and sends it through their own SMSC which is provisioned with a Global Title recognised by Meteor as having a commercial agreement in place for the termination of that message.



*An AA.60 Agreement is usually used in two different settings:

1. cloud-based international connectivity, typically via SS7, between a messaging provider and a terminating MNO, as an alternative to SMPP connectivity which provides a physical infrastructure connection
2. GSMA-regulated enterprise mobile messaging delivery or exchange which allows aggregators and MNOs alike to interface with a home network

UNAUTHORISED ROUTES

UNAUTHORISED ROUTES

ROUTES NOT AUTHORISED FOR SENDING ENTERPRISE MOBILE MESSAGES

The use of unauthorised ways to terminate enterprise mobile messaging brings with it risk to your business, damage and financial losses to different parties within the messaging ecosystem and potential harm to your customers.

Unauthorised routes are used to deliberately bypass authorised channels and their use is common in markets where strict parameters or rules are set for the delivery of international messages by a national regulator or incumbent MNO. Such rules include a restriction on the use of alphanumeric originators for international messages, the required registration of numbers used by international messaging providers or the requirement that international messages must be delivered via an MNO Exclusive Gateway Partner.

Unauthorised connections can be blocked at any time for a number of reasons:

- They are illegal in a country and the regulatory body closes them down
- If used for the delivery of Spam, Malware or Phishing messages
- An MNO installs a Firewall to filter out and discard messages deemed to be unauthorised
- An unauthorised connection is shut down without notice by an MNO
- A connection previously deemed unauthorised is incorporated into an MNOs portfolio of authorised connections by way of newly established technical and commercial agreements and is subsequently subject to contractual restrictions

Identified here are the most common ways used to deliver enterprise mobile messages via unauthorised channels[5]. Please note that this is not an exhaustive list, as technologies and parties seeking to exploit weaknesses are always evolving.

NON-INTERWORKED OFF-NET ROUTES

SIM FARMS OR SIM BOX BYPASS

ROUTES NOT AUTHORISED FOR SENDING ENTERPRISE MOBILE MESSAGES

NON-INTERWORKED OFF-NET ROUTES

Grey Route Bypass

Messages generated outside of an MNO's network may enter via the MNO's P2P Hub or via a roaming signalling link, neither of which are permitted to carry enterprise mobile messaging. The technical and commercial infrastructure established for P2P and for enterprise mobile messaging channels are not the same. P2P channels cannot effectively support the essential features of enterprise mobile messaging and the terminating MNO will not be reimbursed for delivering messages to its subscribers.

Rogue Aggregator Termination

This occurs when an aggregator establishes itself as an MVNO and legitimately obtains their own Global Titles from a regulator, but sends enterprise mobile messages to a terminating MNO via the MNO's P2P Hub or roaming signalling link. The rogue aggregator has no agreement in place with the terminating MNO and the terminating MNO is not reimbursed for their services. The risks described above are applicable in this scenario.

Rogue MNO Termination

Similar to Rogue Aggregator Termination, this occurs when an originating MNO maliciously terminates messages for the recipient MNO, avoiding the latter's termination fees. This scenario is legal in some countries.

SIM FARMS OR SIM BOX BYPASS

A SIM Farm is a bank of SIM cards which are used to deliver enterprise messages, for example by buying SIMs intended for consumers, and then utilising P2P channels to avoid paying wholesale messaging rates. The essential features of enterprise messaging cannot be supported via SIM Farms. However, you might be unaware that your messaging provider or a partner further down the delivery chain is using a SIM Farm. This practice is particularly common in South America, but SIM Farms are found across many regions, including Europe and South East Asia.

The use of certain originators may indicate the use of unauthorised connections. For example, a SIM Farm may make use of consumer retail SIMs, which can be identified through the use of separate and / or sequential MSISDN's associated to each message sent. The consumer SIMs make it appear on the surface to both your customer and their MNO, that your message has been sent from a private individual. However, MNOs are quickly developing their ability to block these messages where they find that the wrong channels are being used.

ENTERPRISE MESSAGING PROCUREMENT

ENTERPRISE MESSAGING PROCUREMENT

In addition to determining the essential features to look for in a messaging solution, additional consideration needs to be given to the practicalities of formally agreeing your requirements with your messaging provider, within the broader context of how authorised and unauthorised connections play their role in the messaging ecosystem today.

- TIERING OF ENTERPRISE MOBILE SOLUTIONS
- PRICING OF AND PAYMENT FOR ENTERPRISE MOBILE MESSAGING SOLUTIONS
- CONTRACTS AND MASTER SERVICE AGREEMENTS
- THE FALSE ECONOMY OF A 'GOOD VALUE' SOLUTION
- BLENDING ROUTES: THE LOWEST QUALITY CONNECTION DETERMINES OVERALL QUALITY
- TAKING GOOD CARE OF YOUR CUSTOMERS AND THEIR PERSONAL DATA
- MULTI-CHANNEL COMMUNICATIONS
- SERVICE SUPPORT LEVELS

ENTERPRISE MESSAGING PROCUREMENT

TIERING OF ENTERPRISE MOBILE MESSAGING SOLUTIONS

It is common for solutions which can connect you to all of your customers around the world to be bought and established through one contract with a single messaging provider. However, as discussed earlier, other parties will need to be involved. This is known as tiering or blending.

The tiering of a connection is often necessary, given the broadness of your customer base or because it gives you an opportunity to buy a variety of effective and sometimes cost-effective authorised solutions to reach your customers.

For example, not all MNOs allow National On-net connections (eg. Meteor Ireland, Three Italy). Therefore, your messaging provider will probably have access to other authorised alternatives, such as a National Off-net connection or via an SS7 connection with an accompanying AA.60 Agreement in place.

However, as more parties join the message delivery chain, your mobile messaging solution is also more exposed to the risks discussed in the Section: Unauthorised Routes.

As seen earlier in the Guide, there are six authorised ways to reach a terminating MNO in order to deliver your message to one of your customers. How your messages move along the delivery chain depends on the two components of a connection, and specifically the contractual obligations of the parties at either end of the delivery chain:

The Type of Connection explains how a message is delivered to the terminating MNO by a Tier 1 Aggregator

The Tiering of a Connection explains where the messaging provider is positioned in the delivery chain in relation to the Tier 1 Aggregator at the end of the chain

ENTERPRISE MESSAGING PROCUREMENT

TIERING OF ENTERPRISE MOBILE MESSAGING SOLUTIONS Cont./

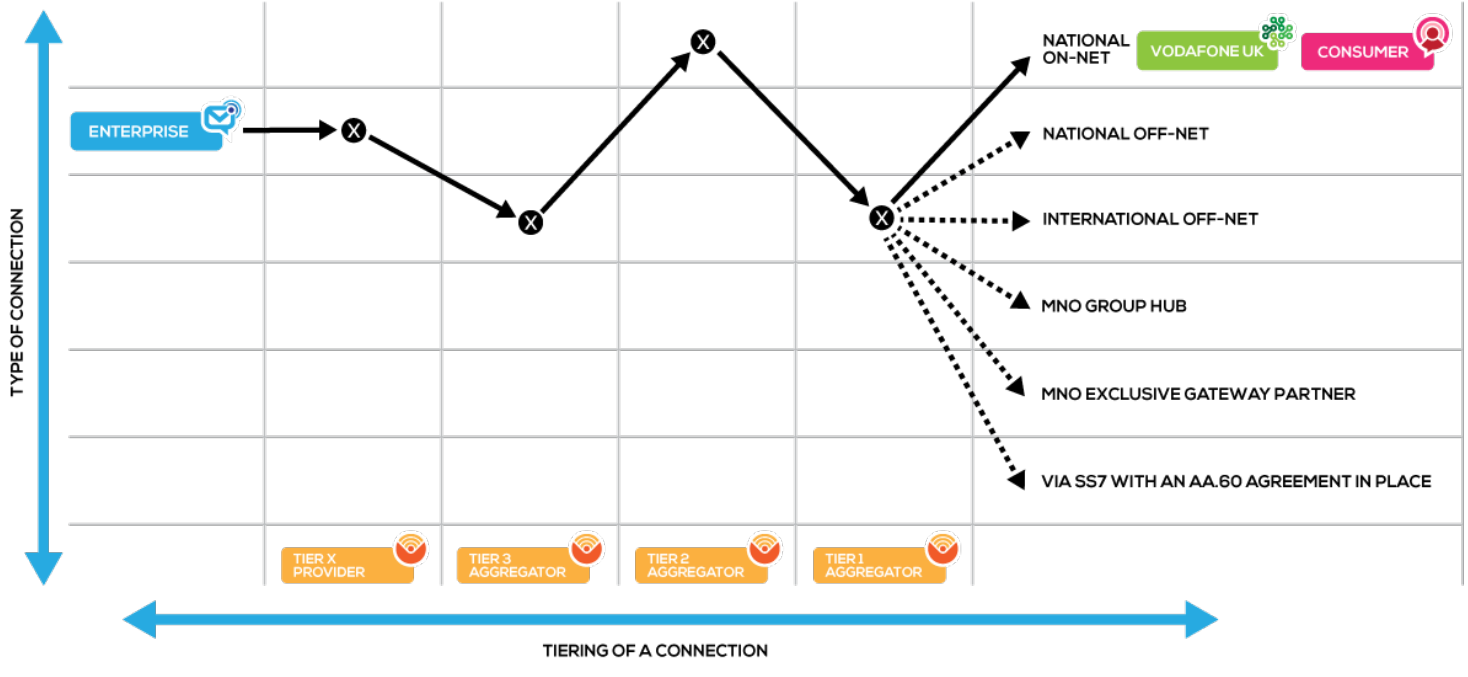
Back to back contracts along the length of the message delivery chain are crucial to ensure that the described route is authorised, legal and that all relevant parties are accountable. Transparency is key to knowing what will happen and what has happened after your messages have left you on their way to your customer.

When it comes to selecting the way in which your message is sent on to your customer's MNO, it is the Tier 1 Aggregator which makes that selection, irrespective of what may have been offered to you by your messaging provider further up the delivery chain.

The diagram and explanation below demonstrate how a connection type and tiering of parties in the delivery chain are tied together:

Explanation:

- A UK Enterprise wants to send messages to its customers who are subscribed to Vodafone UK - the messages are to stay within the UK due to sensitive content
- A Tier X Aggregator sells the UK Enterprise an end to end messaging solution to deliver their messages via an Off-net Connection
- The UK Enterprise believes that they have bought a National Off-net Connection and that their messages will never leave the UK
- Tier X Aggregator does not have a contract in place with the final party in the chain, the Tier 1 Aggregator which is connected to Vodafone UK
- The Tier X Aggregator chooses to use a Tier 3 Aggregator partner in Spain who promises to use a National On-Net or Off-net Connection
- Tier 3 Aggregator sends the messages onto a Tier 2 Aggregator in the UK which has a contract with a Tier 1 Aggregator in the USA who also promises to use a National On-Net or Off-net Connection to Vodafone UK
- The Tier 1 Aggregator selects the final delivery method from one of the connections available to it to send the UK Enterprise's messages to Vodafone UK – in this diagram, they select a National On-net Connection



ENTERPRISE MESSAGING PROCUREMENT

PRICING AND PAYMENT

The pricing of enterprise mobile messaging solutions generally operates on a “per unit” cost model:

- Price for a campaign
- Price per SMS
- Price of SMS delivery for a month

Please note that there should be no reason to pay your messaging provider any initial setup fees or ongoing monthly service fees for enterprise mobile messaging solutions.

The “per unit” cost model offers a standardised way of comparing the costs associated with the key features of a solution, plus any additional service functionality available, such as customer support service levels or the type of connection used.

Price can also be a differentiator between two solutions with comparable functionality or two solutions with different functionalities which are offered at the same price.

Payment relates to the event that triggers an invoice. Your messaging provider will usually invoice for messages on the basis of one of the following:

- “on submitted”, ie, a message has been sent by your messaging provider, or,
- “on successfully delivered to the terminating MNO”, ie, a message has reached your customer’s MNO, or,
- “on successfully delivered to a handset”, ie, the message has arrived on your customer’s handset.

There are many reasons why a message may not reach your customer. A percentage of any delivery is likely to be unsuccessful, for reasons which may or may not be within your provider’s control, such as a handset being switched off or your customer being outside of any network coverage.

If you pay for your messages “on submission”, you are paying for all of the messages sent by your messaging provider, including those which are unsuccessful.

If you pay for your messages “on successfully delivered”, you are paying only for those which reach your customer’s MNO or your customer’s handset. A by-product of this will be that your messaging provider will be incentivised to select partners and authorised connections which will secure a better delivery outcome.

ENTERPRISE MESSAGING PROCUREMENT

CONTRACTS AND MASTER SERVICE AGREEMENTS

Your contract with your messaging provider will define the core terms of your business relationship with them, but the individual terms which apply to each messaging solution you buy will be set out in a Master Service Agreement ("MSA").

If not contained within your core contract, your MSA should set out the following as a minimum, where relevant:

- Define your specific legal requirements and expectations:
  - Solutions will not make use of any illegal or unauthorised connections
  - Your customers' personal data will not leave/enter any jurisdiction where it is unlawful for it to do so, nor be handled by any party for which explicit consent has not been given by your customer
  - Obtain guarantees from your messaging provider that your solution is protected by back to back technical and commercial contracts for the entire length of the end to end delivery chain between you to your customer
  - A guarantee of end to end data security and the encryption of all confidential data throughout the delivery chain, from your systems through to the technical infrastructure within your customer's MNO, backed up by relevant security certificates and IP Protocols
- Define your performance requirements:
  - The time frame for delivery of your message to your customer and how your messaging provider defines latency in the context of the end to end delivery chain
  - Whether your messaging provider can manage the volumes of messages you want to send without delay or queuing
  - Clarify whether throughput is affected by any of the partners or connections along the end to end delivery chain
  - That the delivery-success for your solution falls within acceptable levels
  - That messages can be and are correctly formatted so that they appear on your customers' mobile phones as intended, irrespective of the type of device they are using, the country they are in, or the MNO they are subscribed to
- Define your deliverability requirements:
  - Determine whether payment for messages is billed 'on submission' of your messages, or 'on successful delivery' to your customer's MNO, or 'on successful delivery' to your customer's handset
  - Identify who in the message delivery chain generates the individual message delivery receipts and at which point in the chain each receipt is generated
  - Does the delivery receipt identify:
    - 'successful submission' by your messaging provider, ie, when a message leaves their systems and is sent to an MNO for onward delivery, or
    - successful acceptance by your customer's MNO's SMSC, or
    - successful delivery of your message to your customer's handset
  - The availability of a retry mechanism and under what circumstances and criteria the delivery of messages may be retried
  - Receipt of a message delivery report which provides full information for every message submitted by your messaging provider, ie, all messages that leave their systems, showing the percentage of successfully delivered messages, reasons for delayed or failed delivery and main destinations of delivery
- Clarify whether there are any additional parties in the end to end delivery chain and whether the performance criteria offered by your messaging provider:
  - is the maximum quality they can offer under ideal circumstances or whether they are offering the best that is available within a particular solution in terms of latency, throughput, availability, etc
  - might be affected by other parties in the chain, eg, your messaging provider has a maximum throughput of 'X', but one of their partners can only offer a throughput of 'Y' – the end to end throughput for the route will therefore be 'Y'
- Clarify whether redundancy has been included within the solution and where your agreed route will fail-over to in the event of a loss in service
- Confirm that the "blending" of routes for commercial optimisation by your messaging provider is not permitted, unless you yourself have agreed to this and that the routes used are all authorised

ENTERPRISE MESSAGING PROCUREMENT

THE FALSE ECONOMY OF A 'GOOD VALUE' SOLUTION

Both authorised and unauthorised connections are available in the marketplace and it is likely that at some point, unauthorised connections will be presented to you.

For your messaging provider, unauthorised routes can provide a way to gain an unfair competitive advantage over their peers and win your business by offering what appears to be an attractively low price. However, while an offer may appear competitive, buying a solution which makes use of unauthorised connections comes with inherent risks - the legal connectivity and protections afforded by a legitimate and reliable end to end messaging solution cannot be guaranteed.

Any break in the back to back contractual chain brings with it a risk to service legality and service quality, with messages at risk of delay, loss or even deletion, a lack of accountability, delays in the restoration of services in the event of a problem or even regulatory intervention.

It should also be noted that the overall cost to your business in relation to a low cost solution, which is made possible through the use of unauthorised routes, can rise due to poor quality in terms of higher latency or worse deliverability. For example, if you send 100 messages at a cost below the market rate, but where an associated risk means that 5% of your messages are never sent, the consequential loss to your business could be significant, for example, if messages are time-critical or contain sensitive information.

As stated earlier, MNOs set the market price for the delivery of enterprise mobile messages into specific countries, which forms the basis on which the structure of a competitive messaging industry is formed. Therefore, if the price offered to you by a messaging provider falls below the set market price, it is likely that part of the route is not authorised for the delivery of your messages.

ENTERPRISE MESSAGING PROCUREMENT

BLENDING ROUTES: THE LOWEST QUALITY CONNECTION DETERMINES OVERALL QUALITY

The blending or tiering of a connection makes use of two or more connections within a route, generally targeting a lowest cost option for the delivery of messages to the final destination. As long all of the connections used are authorised, this is not a problem, rather simply the market at work.

Unless your messaging provider has informed you, it may not be apparent that blending is occurring within your solution and so you may be unaware of the effect this may have on the quality of your route.

Apart from the potential illegality of blending outside of authorised routes, if unauthorised routes are used along the delivery chain, it is important to note that the quality and reliability of a route will only be as good as the 'weakest' link within the end to end delivery chain. It is therefore essential to know:

- that the performance of any additional partners in the delivery chain matches what you have been sold
- whether the solution you have bought is the one you have been provided

Whether you have opted for blended routes or not, it is important to review reports from your messaging provider to check the legitimacy of the routes used alongside their quality in relation to what you requested and ultimately pay for.

ENTERPRISE MESSAGING PROCUREMENT

TAKING GOOD CARE OF YOUR CUSTOMERS AND THEIR PERSONAL DATA

You are responsible for your customer's data at all times, from the moment they give you their consent to collect, store and use it, until they are no longer a customer and even beyond.

When you sign an agreement with a messaging provider, you should agree on how sensitive data will be handled, but ultimately, you retain responsibility at all times.

If your customer data is current but a significant percentage of your messages are not being successfully delivered, this can indicate the use of a poor quality connection which should be reviewed with your messaging provider.

In addition, MNOs will assess the rates of undelivered messages which travel through their networks and may impose penalties if message failure rates exceed a certain percentage. Regular monitoring and maintenance of your distribution lists should assist in ensuring that your records are up to date prior to the deployment of a messaging solution or individual campaign:

- You must ensure that you have your customer's consent to send them specific categories of message or types of content.
- Do not share your customer's data with any third party unless they have given you their explicit consent to do so and confirmed under what circumstances it may be shared and subsequently used
- Review the reasons that messages have not been delivered against the delivery reports and ensure that your distribution lists are regularly cleaned
- If a customer asks you to stop communicating with them by SMS, remove their number from your distribution lists immediately

If you have not had any active communication with a customer for a period of time, commonly six months, you should remove their number from your distribution lists. Your customer may have changed mobile number since you last communicated with them by SMS – MNOs generally quarantine numbers for six months and then release them to new subscribers. Under these circumstances, the new mobile subscriber will not be your customer.

Furthermore, effectively managing your relationship with your customers is key to securing their trust and ongoing engagement and this includes how and when you send them messages.

Consider the frequency and timings of the messages you send, both in terms of national or regional restrictions and what would be considered acceptable by any reasonable customer. Overzealous marketing, however well intentioned, may not be well received by your customer, nor would a message received at midnight, which would actually be prohibited in some countries.

Ultimately the MNOs are responsible for ensuring that their channels are not being used in a way which may cause harm to their subscribers, namely your customers. Your messages are likely to be blocked if an MNO detects anything suspicious.

ENTERPRISE MESSAGING PROCUREMENT

MULTI-CHANNEL COMMUNICATIONS

Technically speaking, SMS provides one channel of communication. Some messaging providers offer solutions which enable the delivery of multi-channel communications to individual customers across a single platform, for example, via SMS, e-mail and fixed line.

Multi-channel communications may be useful if you want to prioritise the way in which you communicate with each of your customers if they have shared their communication preferences, additional personal data and consent for the use of their data in specific ways. This is of particular relevance today with a significant number of mobile users expressing a preference for SMS as a preferred channel of communication when communicating with an enterprise.

SERVICE SUPPORT LEVELS

Messaging providers may offer different levels of support in terms of when and how a variety of issues may be dealt with and their associated target resolution times. For example, the provision of 24/7 client support, or tiered support with the acknowledgement and resolution of specific technical or operational issues assured within pre-defined and agreed timeframes.

ABOUT THE PROGRAMME

Established in 2015, MEF's Future of Messaging Programme is a worldwide, cross-ecosystem approach to promote a competitive, fair and innovative market for mobile communication between businesses and consumers. Programme participants represent different regions and stakeholder groups working collaboratively to:

- Produce and publish best practice frameworks, papers and tools to accelerate market clean-up and limit revenue leakage
- Educate buyers of enterprise messaging solutions
- Promote enterprise mobile messaging as a premium and trusted channel
- Drive knowledge across the ecosystem of new platforms, technologies and procedures to address the evolving messaging landscape
- Develop the value-chain to support new use cases and business

MEF FUTURE OF MESSAGING PROGRAMME

FOR FURTHER INFORMATION ON THE FUTURE OF MESSAGING PROGRAMME AND TO GET INVOLVED PLEASE VISIT:

WWW.FUTUREOFMESSAGING.COM
WWW.MOBILEECOSYSTEMFORUM.COM

PROGRAMME PARTICIPANTS

BICS is recognized in the wholesale communications market as a top global voice carrier and the leading provider of mobile data services. It aims at bridging the telecom world with the new unconventional communication providers worldwide.

BICS' innovative suite of solutions for Voice, Messaging, Data & Connectivity, Business Intelligence & Analytics, Fraud & Authentication, Roaming, MVNE and Asset Monetization bring value to its customers' businesses by enabling them to offer state-of-the-art communication services.

Its headquarters are located in Brussels and offers global connectivity with strong presence in Africa, Americas, Asia-Pacific, Europe and Middle East. Its regional offices are located in Bern, Madrid, Dubai, New York, San Francisco and Singapore, its satellite office is located in Beijing and its local representations are based in Accra, Cape Town, Miami, Montevideo, Nairobi and Toronto.

BICS is a pioneer into the future of next generation communications and have achieved a series of World's Firsts successes with the launch of the first LTE Roaming relation or the first VoLTE International call between Europe and Asia, to name a few. With a diverse and multicultural team of about 500 employees, BICS continuously strive to provide customers with the highest level of quality, reliability and interoperability, enabling them to maximize their end-user value.

CLX Communications connects enterprises to people and things. We combine programmable API's and cloud computing with our unparalleled Tier 1 Super Network to make it easy for businesses to embed global communications, including voice, SMS and mobile data into their apps, business processes and IoT devices.

Our leading communications Platform-as-a-Service (CPaaS) delivers one of the highest service levels in the industry whilst processing more than 1 billion API calls per month across 6 continents. We provide services to 4 of the top 5 CPaaS companies, and 3 of the top 5 global internet brands with Tier 1 connectivity on which many of their services rely.

CLX Communications (publ) is listed on the Nasdaq in Stockholm.

CM Telecom is a technology company that provides businesses with a single platform to enable (business critical) mobile messaging through push notifications, sms and voice messaging and mobile payments & security.

With offices around the world, CM Telecom serves more than 25.000 businesses including the largest internet companies. CM Telecom's platform is powered by its own self-designed infrastructure, supported by a 24/7 network operations centre including in-house data centres and fibre networks across Europe.

DIMOCO Messaging provides carrier-grade, high quality messaging products enabling our clients to communicate to their customers on a truly global scale.

We leverage our relationships with Mobile Network Operators and in-country partners to offer clients Direct connectivity while combining local market expertise with fast message delivery.

DIMOCO Messaging holds an MNO license and operates a carrier-grade messaging platform with highest quality industry standards. We offer our clients the best way to optimize communication with their customers and employees by seamless integration to our platform, fully featured high quality products, multiple channels for instant support and advanced reporting and analytics tools.

PROGRAMME PARTICIPANTS

Soluciones Tecnológicas del Nuevo Milenio

The Eclipsoft business group, operating as integrator of mobile services and working through a strategic alliance with mobile operators in Ecuador Claro, Movistar and CNT; We can bring our services to the large mass of users of cellular technology. We implemented interesting value-added messaging services.

– Technical and maintenance of the platform for sending and receiving messages Support.

– Mediation between the client and the cellular operator.

– Shipping Conciliation SMS messaging messages.

– Monitoring of traffic in the short codes from our customers.

– Mobile applications that can maintain real contact with their customers

We are leaders in this type of product at the level of banking

And we are innovative in content SMS portals.

At iconectiv, we envision a world without boundaries, where the ability to access and exchange information is simple, secure and seamless. As the authoritative partner of the communications industry for more than 30 years, our market-leading solutions enable the interconnection of networks, devices, and applications for more than two billion people every day. Working closely with private, government and non-governmental organizations, iconectiv has intimate knowledge of the intricacies and complexities of creating, operating and securing the telecommunications infrastructure for service providers, governments and enterprises. iconectiv provides network and operations management, numbering, registry, messaging and fraud and identity solutions to more than 1,200 customers globally.

A US-based company, iconectiv, doing business as Telcordia Technologies, is a wholly owned subsidiary of Ericsson. For more information, visit www.iconectiv.com.

IMImobile is a leading provider of software and services that enables organisations with the ability to harness network, device and channel capabilities to improve service delivery and customer engagement.

We will help you to reduce the cost and complexity of digital service delivery across IT, marketing and customer support, leading to better customer journeys and customer experience.

With deployments in 60 countries, processing billions of digital touch points per month, we are a trusted vendor to blue-chip businesses around the world.

Infinite Convergence provides innovative messaging and mobility solutions and next-generation wireless communication technologies to mobile operators and enterprises. Currently supporting more than 130 million subscribers and about 1 trillion messages per year globally,

Infinite Convergence offers, a complete range of scalable Enterprise Messaging Services, Rich Communication Suite, Converged Messaging, Public Safety Messaging, SMS, MMS, and Gateway solutions for businesses and Tier 1 wireless operators globally.

In addition to this, NetSfere is an award-winning, secure enterprise messaging service from Infinite Convergence, which provides enterprises with a private, reliable centrally managed and controlled, cloud-based messaging service.

Formed in 2010 from an alliance between Infinite Computer Solutions (BSE: 533154|NSE: INFINITE) and Motorola (now Nokia), Infinite Convergence has earned a reputation for delivering unparalleled performance and reliability in messaging and mobility. Although we are headquartered in Chicago, we are a truly global company, with a business presence in the USA, Germany, India and Singapore.

PROGRAMME PARTICIPANTS

Since its start over a decade ago, Infobip has grown into an international business with 50+ offices and proprietary, in-house developed communications platform with the capacity to reach 6 billion mobile devices connected to over 800 telecoms networks.

Innovating at the intersection of internet and telecoms technologies, Infobip creates new opportunities for businesses and their end users to interact on mobile devices and over multiple channels – SMS, voice, push notifications, globally popular chat apps, or email.

Infobip's geo-distributed infrastructure is maintained by a 300-strong dev and engineering force, and quality tech support with industry's best response times.

With unsurpassed zero-hop connectivity to telecoms worldwide, and full control over the infrastructure that underpins its services, Infobip is the largest messaging network of its kind and the only full-stack cPaaS globally.

Infracast is a Managed Service Provider and Systems Integrator. We build and deliver strategic mobile customer engagement solutions for enterprise clients.

Our solutions are trusted and relied-upon by global enterprise customers as an integral component of their business processes. Our customers include global Banks & Financial institutions, Airlines, Retail, Telco, OTT and media organisations across the UK, EMEA, Latin America and world-wide. These organisations have one thing in common – the need to communicate reliably and effectively with their customers.

We understand your delivery promise to your customers. We understand that each message has a direct impact on customer satisfaction and your brand reputation.

We've been pioneers in value added services and specialised messaging products since 1995, providing universal solutions to scores of corporates, SMS aggregators, and resellers across the world.

At iTouch, we've developed an in-house, high performance and world-standard messaging platform **certified by leading international banks**. It delivers SMS MT, MO and Number Context services covering over 800 operators in 160 countries. And as leading specialists in Africa, we deliver OTP's, transactional, marketing and service messaging throughout the continent.

A company bent on Innovation since 1995, allow us to introduce our new generation of messaging platforms, MEMS: just as the feature phone led to the smart phone, our team developed SMS to MEMS - iTouch's very own *Multi-Channel Embedded Messaging Service* - a world-winner in interactive rich media messaging.

With infinite solutions to today's challenges, call iTouch to find out how we can help get your messages out faster, further and with complete freedom of mind.

JT are a world class, Tier 1, global communications provider of a full suite of managed products and services.

Our range includes next-generation infrastructure with fixed line, mobile, broadband/ISP, network connectivity and hosting as well as world-leading high-speed fibre broadband services.

With over 120 years' experience in telecommunications we are dedicated to delivering world-class services. We are a full-service global consumer and business enterprise provider, with services covering domestic fixed land line through to leading-edge data hosting for the e-gaming industry.

PROGRAMME PARTICIPANTS

For more than a decade, Mahindra Comviva has partnered with some of the world's largest and fastest growing mobile service providers, offering mobility solutions that have accelerated revenue growth, enhanced customer loyalty and delivered greater cost efficiencies. Today, we have an established presence in more than 90 countries, providing over a billion mobile users access to our solutions globally. Our focus has always been on creating value for our partners and customers. We have achieved this through our portfolio of productized solutions that not only enhance the end-user's mobile experience but also improve our partners' business performance.

We have enabled this by deploying solutions that exploit legacy investments and have incorporated advanced technology, service delivery and management techniques into its application, platform and service offerings.

As a global leader in mobility solutions, Mahindra Comviva has helped and continues to transform the lives of over a billion people across the globe.

With Headquarters in Zug, Switzerland and offices around the world, Mitto's agile approach, trusted mobile operator relationships and carrier-grade SMS Messaging platform improve conversions and increase the speed and reliability of global mobile communications for the world's largest OTTs, Enterprise and Mobile Operators.

Our mission is to provide customers with the most reliable, robust SMS Messaging service in the industry. That's why technology is at the heart of everything we do. Our in-house team of developers make up more than a third of our staff and between them have designed a platform that guarantees our customers' SMS messages get to the right person, at the right time, in the right place – in the most cost effective way possible.

For more information about Mitto visit www.mitto.ch.

MMDSmart Ltd, the smart messaging pioneer, provides smart communications solutions to organizations of all sizes. Started in 2007 as a voice transit company its product offering now includes retail and wholesale voice services, Fax over IP and chat solutions, as well as A2P messaging.

Its innovative smart messaging platform, the first results driven messaging solution, provides unique tools to improve message delivery, drive greater customer engagement and achieve higher conversion rates.

With headquarters in Tel Aviv, regional offices in Hong Kong and Kiev, and a development center in Nizhny Novgorod, Russia, it is focused on providing the highest quality communications solutions and services to its partners and clients around the globe, which include many tier 1 companies from more than 100 countries and more than 300 interconnections.

As it expands its global scope, its initial mission and commitment stays the same; MMDSmart. Connect. Engage. Smile

Movile is the industry leader for development of mobile content and commerce platforms in Latin America. With products for mobile phones, smartphones and tablets, our work makes people's lives better and a lot more fun.

Games, on-line education, entertainment apps for adults and kids and many options for buying with confidence and comfort. All of that gets to you through Movile.

For companies, Movile delivers complete products, integrating transactions in M-Commerce, M-Payments and content distribution, fast and with quality.

Millions of people use Movile apps every day. Always enjoying the most practical and reliable way of paying through their mobile devices.

Movile is the company behind the apps that make your life easier.

PROGRAMME PARTICIPANTS

Vonage (NYSE: VG) is a leading provider of Cloud Communications for Business. Through innovative cloud technology, Vonage delivers more scalable, cost-effective and integrated communications to businesses.

The Company transforms the way people work and businesses operate through a portfolio of cloud-based communications solutions that enable internal collaboration among employees, while also keeping companies closely connected with their customers, across any mode of communication, on any device.

Nexmo, the Vonage API Platform provides tools for voice, messaging and phone verification services, allowing developers to embed contextual, programmable communications into mobile apps, websites and business systems to drive their businesses. Nexmo enables enterprises to reimagine their digital customer experiences by providing them with the tools they need to easily communicate relevant information to their customers in real time, anywhere in the world, through text messaging, chat, social media and voice.

OpenMarket helps the biggest brands in the world use mobile messaging to connect with their customers in the moments when it counts. When they need to be there and be responsive in real-time. When customer experience isn't just a buzzword: it's an obsession.

OpenMarket combines a powerful, scalable and reliable platform with a deep understanding of how text messaging can transform business processes. It works closely with clients to deliver timely, useful and context-sensitive mobile messages that surprise and delight their customers around the world at massive scale. OpenMarket calls this the Empathetic Interaction and its changing the way enterprises engage with their customers.

With trusted relationships with mobile operators across the globe, OpenMarket offers faster time to market, and ongoing support for its enterprise customers. OpenMarket is a division of Amdocs and is headquartered in Seattle, Washington, with regional offices in Detroit, London, Sydney, Guadalajara (Mexico) and Pune (India).

R&D Communication represents a high standing reality in the Italian market and in 15 years it has accomplished to be a well renowned technological platform from which to send A2P messaging. The maximum level solutions offered by us permit you to plan and empower your business Marketing and Communication systems.

The strong passion and dedication that we have for the messaging world helped us extend and be efficient as well in the International market and we are now glad to be the Gateway that connects people around the world.

RealNetworks®, Inc. delivers digital entertainment services to consumers via PC, portable music player, home entertainment system or mobile phone.

Real created the streaming media category in 1995 and has continued to lead the market with pioneering products and services, including: RealPlayer®, the first mainstream media player to enable one-click downloading and recording of Internet video; the award-winning Rhapsody® digital music service, which delivers more than 1 billion songs per year; RealArcade®, one of the largest casual games destinations on the Web; and a variety of mobile entertainment services, such as ringback tones, offered to consumers through leading wireless carriers around the world.

PROGRAMME PARTICIPANTS

Route Mobile Limited (RML), established 2004, is a leading global messaging and voice API company. Headquartered in Mumbai, India, the company has offices in the Middle East, Africa, Asia Pacific and Europe and services over 18.000 customers through a network of more than 300 employees.

Through its portfolio of comprehensive, flexible & innovative solutions including Enterprise as well as 2way Messaging, HLR Number Lookup, SMS Firewall, Interactive Voice Response (IVR), Click 2 Call, Chatbots, Outbound Dialer and SMS Hub, Route Mobile meets and exceeds its customer's requirements. With over twelve years experience RML provides tailored solutions to enterprises, aggregators, resellers and mobile network operators (MNOs).

Supporting over 850 global network connections, 150 of which direct, RML routes more than 2 billion messages per month. The company is uniquely placed encompassing approved open connectivity, SMS hub provision and SMSCs globally.

SAP Mobile Services, a division of SAP, provides cloud-based engagement services to enterprises that enable them to connect the "last mile" to their customers, cloud-based analytic services that aggregates and analyzes mobile operator data to provide deep consumer insight to brands and retailers, and interconnection services to mobile operators that allows any two people in the world text each other. We operate the world's largest, most reliable cloud messaging network, reaching 6.11 billion subscribers on 990 operators in 214 countries and processing over 1.8 billion messages per day.

As market leader in enterprise application software, SAP helps companies of all sizes and industries run better. From back office to boardroom, warehouse to storefront, desktop to mobile device – SAP empowers people and organizations to work together more efficiently and use business insight more effectively to stay ahead of the competition. SAP applications and services enable approximately 310,000 business and public sector customers to operate profitably, adapt continuously, and grow sustainably.

For more details about how SAP Mobile Services can transform your business and improve customer experiences in the digital economy visit us on the web at SAP Mobile Services. To learn more about intelligent and interconnected mobile engagements, join the SAP Mobile Services Community

Telefónica is one of the largest telecommunications companies in the world in terms of market capitalisation and number of customers. With its best in class mobile, fixed and broadband networks, and innovative portfolio of digital solutions, Telefónica is transforming itself into a 'Digital Telco', a company that will be even better placed to meet the needs of its customers and capture new revenue growth.

The company has a significant presence in 24 countries and a customer base that amounts more than 315.7 million accesses around the world. Telefónica has a strong presence in Spain, Europe and Latin America, where the company focuses an important part of its growth strategy.

TIMWE Group is a global provider of mobile engagement solutions.

We ensure that mobile operators, governments and many other mobile-driven businesses increase revenue and reach, while reducing their operational costs, by delivering compelling end to end services and bespoke solutions on the cloud and on premise.

At the moment we are catering our clients through three business brands distributed globally: DIGIWE – Digital Mobile Solutions, TECHWE – Technology Solutions and GOVWE – Government Solutions.

With over 10 years of international experience and our proprietary, multipurpose mobile engagement platforms, we design, develop and deliver turnkey projects for our customers across all 5 continents.

TIMWE Group operates in 80 countries through 30 offices. Outside of our core Latin American and Middle Eastern markets, we are rapidly consolidating our position across Africa, Eastern Europe and the Asian regions.

PROGRAMME PARTICIPANTS

Turk Telekom International (TTI) is 100% owned by Turk Telekom and acts as its international business unit handling all international data, wholesale voice business functions and roaming partnerships with all LTE/GSM/CDMA operators and MVNOs globally.

Turk Telekom International provides single account management and unified network operations over the entire Turk Telekom International network which includes 20 countries in Central and Eastern Europe, Turkey, Middle East and the Caucasus, covering a full range of Internet/data services, infrastructure and wholesale voice services to incumbents, alternative carriers, mobile operators, cable TV companies, Internet service providers and corporate customers.

Turk Telekom International offers premium quality telecommunication solutions in the form of: guaranteed SLA-s, local experts, dedicated staff, centralized end-to-end network management, trustworthy and reliable attitude, delivering on commitments, on-time delivery, tailor-made, scalable and cost-effective technical solutions and a proven management team with a full service portfolio. Covering over 40,000 km of fiber optic network and more than 150 interconnections worldwide Turk Telekom International is one of the most important players for the global telecommunications industry.

Twilio is reinventing telecom by merging the worlds of cloud computing, web services and telecommunications. Twilio hosts a telephony infrastructure web service in the cloud, allowing web programmers to integrate phone calls and SMS messages into their applications. Twilio's simple, powerful API minimizes the learning curve required to build advanced, reliable communications applications, and its Pay-As-You-Go pricing model means customers pay for capacity only when they need it, not before.

The company is funded by Bessemer Venture Partners, Union Square Ventures, Founders Fund, Mitch Kapor and other prominent investors, and is headquartered in San Francisco, CA.

TWW is one of Brazil´s main SMS aggregators. We are directly connected to all the Brazilian carriers and MVNO´s. We are specialists in SMS and use only one route. Direct connect.

TWW's SMS service makes it possible for your company to connect wherever necessary in the Brazilian territory. With a secure and prepared technological infrastructure, we offer personalized service to guarantee the efficiency you want to reach with the results you need. Your company will find a technical team that is dedicated 24 hours a day, 365 days a year to identify adequate solutions, implement tools, integrate your systems and, above all, serve your needs with agility. After all, a quick and effective connection is the key to a successful relationship! We can make your life simple in Brazil.

Founded in 2011, Veoo is a global mobile consultancy and leading provider of mobile messaging solutions; providing a cloud communications platform and one-stop-shop for any business looking to implement mobile. With a strong pedigree in mobile payments, mobile engagement and marketing and the online entertainment industry, Veoo is breaking new boundaries and challenging the status quo.

A global player, Veoo already has offices in 26 countries across Europe, Asia, Central America and South America and is set to expand into Northern America, the Philippines and Canada by the end of 2017. With a portfolio of over 150 large-scale customers, Veoo works across a variety of industries including retail, financial services, online entertainment and many more.

PROGRAMME PARTICIPANTS

Vodafone is one of the world's largest telecommunications companies and provides a range of services including voice, messaging, data and fixed communications. Vodafone has mobile operations in 26 countries, partners with mobile networks in 49 more, and fixed broadband operations in 17 markets. As of 30 September 2016, Vodafone had 470 million mobile customers and 14 million fixed broadband customers. For more information, please visit: www.vodafone.com.

WAU is Latin America's largest mobile transaction network, providing a single point of contact for mobile messaging connectivity and billing services to global companies looking to expand their services to Latin America.

With headquarters in Miami, FL, offices in 15 countries and connectivity with over 45 wireless operators, WAU simplifies doing mobile business in Latin America, helping its customers efficiently reach, engage and monetize the region's burgeoning mobile consumer base.

We are leaders in enterprise mobility in Brazil. Your company needs to be in all places at once. Must reach and impact all public and consumers.

We know the way, the technologies and also the behavior of mobile users and we can assist you in this.

We are in the market for over 12 years and serve thousands of companies from different segments, sending and receiving millions of messages every day. Our history proves our credibility and leadership. Your result is our result.

ABOUT MEF

The Mobile Ecosystem Forum is a global trade body that acts as an impartial and authoritative champion for addressing issues affecting the broadening mobile ecosystem. We provide our members with a global and cross-sector platform for networking, collaboration and advancing industry solutions. The goal is to accelerate the growth of a sustainable mobile ecosystem that drives inclusion for all and delivers trusted services that enrich the lives of consumers worldwide. Established in 2000 and headquartered in the UK, MEF has Regional Chapters across Africa, Asia, Europe, Middle East, North and Latin America.

GLOSSARY

2FA (Two Factor Authentication)

A process which enables the confirmation of an individual's claimed identity by using a combination of two different components, namely:

1) something an individual possesses or is inseparable from them, and

2) something the individual knows

For example, a 2FA process for a mobile subscriber might require their being in possession of a mobile device, plus a PIN.

A2P SMS (Application to Person)

Messages originated by computer or application and intended for delivery to the subscribers of MNOs. A2P SMS is typically used by enterprise to communicate and share information with their customers, for example, bank balance alerts, retail order or delivery confirmation, appointment reminders and offers. A2P is generally used to send one-way messages but two-way A2P SMS communication is possible in some markets.

AA Agreements

A range of template agreements issued by the GSMA which establish contractual and commercial protocols between originating MNOs, terminating MNOs and messaging providers for the delivery of messages, including:

- AA.12 International Roaming
- AA.13 International Roaming
- AA.14 International Roaming
- AA.19: Commercial agreement for message termination
- AA.60: Commercial agreement for message termination

Access Hacking, Hacking

The act of gaining access to a mobile operating system, app or device by someone without the permission of the owner. Please refer to the MEF A2P Messaging Fraud Framework for more information.

Aggregator

A company that provides connectivity between MNOs and messaging providers. See also Tier 1 Aggregator and Tier 2 Aggregator.

Alphanumeric Originator; Alpha Originator, Alpha Tag

See Originator.

Anti-Virus Software

Software designed to protect internet-connected devices, including mobile devices, from malicious software, also known as malware, or viruses. See also SMS Malware.

Artificial Inflation of Traffic (AIT)

The act artificially generating messages which are sent by a rogue party to itself in order to generate profit. Please refer to the MEF A2P Messaging Fraud Framework for more information.

Application Service Provider, Application2Person Service Provider (ASP)

A company that manages and distributes software-based services and solutions.

Availability

This describes the reliability or 'uptime' of a route in terms of the percentage of time that a connection is fully operational within a specified period of time. A route which has 99.999% availability within a single and continuous 24 hours period is more reliable than a route with 99.9% availability during the same period. See also Redundancy.

Blending

The use of two of more connections within an end to end message delivery chain for the delivery of messages to one destination.

Bulk SMS

A service which enables enterprise to send high volumes of non-premium rate messages quickly and efficiently. Bulk SMS is usually delivered with no charge to the receiving party, but local exceptions do exist.

Bulk Traffic

A term for mass marketing, whereby multiple recipients receive the same message.

Cloud Communications Provider

A company which delivers internet-voice and data communications applications and services.

CNAME (Canonical Name)

A type of resource record in the DNS which specifies that a domain name is an alias for another domain, namely the "canonical" name. All information, including subdomains and IP addresses etc, are defined by the canonical domain.

GLOSSARY

Connection, SMS Connection, A2P Connection

The technical and commercial infrastructure which enables the delivery of messages through an end to end message delivery chain between a sender and recipient.

D&B Number; DUNS; D-U-N-S (Dunn & Bradstreet Number):

A unique numerical identifier assigned to a single business entity which is recognised worldwide.

Delivery Receipt (DLR)

A receipt to confirm that a message has been successfully sent by a messaging provider or that a message has been successfully delivered to a subscriber's MNO or handset. See also Message Status.

DNS (Domain Name System):

The Internet's system for converting alphabetic names into numeric IP addresses.

Expired Message

A message which has not been sent by a messaging provider within a specified time.

Firewall

A filtering system which enables MNOs to monitor, detect, block and report suspicious or unauthorised messages destined for delivery through their network and to their subscribers

FSM (Forward Short Message)

The second of two SS7 requests generated by an SMSC when a message is being sent, the first being an SRI. Both an SRI and an FSM request are required to send a message.

Global Title (GT)

An address used in the SCCP protocol for routing messages through an MNOs network. A Global Title is a unique address which refers to a single destination, though in practice, destinations can change over time.

Grey Route

A connection used for the delivery of enterprise messages, but which is not authorised for that use, for example, where the absence of a commercial agreement for a connection is exploited as a lower cost option at the expense of the terminating MNO. Please refer to the MEF A2P Messaging Fraud Framework for more information.

GSM Network (Global System for Mobile Communication)

An open, digital mobile technology used for transmitting mobile voice and data services.

GSMA

A global membership organisation which represents the interests of MNOs and companies within the broader mobile ecosystem The GSMA issues technical standards and template agreements which establish contractual and commercial protocols between originating MNOs, terminating MNOs and messaging providers for the delivery of messages. See also AA Agreements.

HLR (Home Location Register)

The database within a GSM Network which stores all mobile subscriber data, including the subscriber's location (eg, home or roaming), phone status, (eg, on, off, inbox full etc) and their mobile network.

Hop

This refers to the point within an end to end message delivery chain where one partner connects to the next.

Hub

A structure for the international flow and mobile interoperability of SMS between MNOs to intermediate messages and to offer greater coverage, also known as Hubbing. A Hub can be established to connect an MNO's subsidiary companies to each other, or to other MNOs or MNO Group Hubs for the delivery of enterprise messaging. A P2P Hub is designated for the delivery of P2P messages only.

Group Hub

See 'Hub'.

IMSI (International Mobile Subscriber Identity)

A unique number, usually fifteen digits, which identifies a GSM mobile network subscriber.

Interconnection / Interconnect / Interworking Agreement

A technical, operational and / or commercial contract between two parties within an end to end message delivery chain which connects an enterprise to their customer for the delivery of messages.

GLOSSARY

International Message

A message which has originated at source from an IP address not registered within the country of delivery

Latency

This describes the time taken from the acceptance of a single message into the delivering MNO's SMSC to a mobile subscriber's device. It is also commonly used to describe the time taken for a message to travel from the sender to the recipient.

M2M (Machine to Machine)

Direct communication between devices using any communications channel, including wired and wireless.

MAP (Mobile Application Part)

An SS7 protocol used to access the Home Location Register, Visitor Location Register, Mobile Switching Centre, Equipment Identity Register, Authentication Centre, Short Message Service Centre and Serving GPRS Support Node.

MAP Global Title Faking

Manipulation of specific technical parameters or disguising a message sender's true identity in order to gain access to an MNO's network to deliver messages which would otherwise be flagged as unauthorised and rejected an MNO. Please refer to the MEF A2P Messaging Fraud Framework for more information.

Message Status

Every message which enters a messaging provider's systems for delivery to a mobile subscriber is assigned a status, the most common of which are:

- Sent: message submitted towards the terminating MNOs SMSC
- Delivered: message delivered to the mobile subscriber's handset
- Rejected: message rejected by the terminating MNO's SMSC
- Invalid Number: mobile subscriber's number is invalid (eg, missing digits)
- Undelivered: message not delivered to the mobile subscriber's handset
- Expired: message not delivered within the pre-set time period
- No Credits: insufficient prepay credit available to send the message
- Absent Subscriber: handset is off or out of network coverage

See also Delivery Receipt (DLR)

Messaging Provider

An enterprise-facing company which sells end to end enterprise mobile messaging solutions. A messaging provider may have one or more technical or commercial roles and will commonly partner with others within the messaging ecosystem, by way of agreements to deliver end-to-end solutions.

MMS (Multimedia Messaging Service)

A descendant of SMS, which extends SMS messaging to include longer text, graphics, photos, audio clips, video clips, or any combination of the above, within certain size limits.

Mobile Network Operator; Mobile Operator (MNO)

An MNO provides wireless or mobile communication services and owns or controls all of the elements of the network infrastructure necessary to deliver services to a mobile subscriber. All MNOs must also own or control access to a radio spectrum license which has been issued by a regulatory or government body. An MNO typically controls provisioning, billing and customer care, marketing and engineering organisations needed to sell, deliver and bill for services, though these systems and functions can be outsourced.

Mobile Originated (MO)

This describes the source of a sent message, ie, the beginning of the end to end message delivery chain. See also Originating Mobile Operator.

MNP (Mobile Number Portability)

This lets a mobile subscriber move from one MNO to another while keeping their number, also known as porting. MNP has made it impossible to determine the mobile network of an MSISDN by its prefix.

MSISDN (Mobile Station International Subscriber Directory Number)

The unique mobile phone number attached to a SIM card used in a mobile device.

MSC (Mobile Switching Centre)

An MSC routes messages, performs service billing and interfaces with other telecoms networks, such as the public switched telephone network (PSTN). All forms of communication, whether between two mobile phones or between a mobile phone and a landline telephone, travel through the MSC.

GLOSSARY

MSU (Message Signal Unit)

An individual MSU is required for each SRI request, SRI response, FSM request and FSM response when delivering a message.

Mobile Subscriber, Subscriber, End User

An individual who is a customer of, and connected to, a domestic MNO's network for services, including voice calls, SMS, MMS or data.

Mobile Terminated (MT)

This describes the destination of a sent message, ie, the end of the end to end message delivery chain. See also Terminating Mobile Operator.

MTP (Message Transfer Part)

Part of the SS7 Network, the MTP is responsible for reliable, unduplicated and in-sequence delivery of messages between partners within the end to end message delivery chain.

MVNO (Mobile Virtual Network Operator)

A wireless or mobile communications services provider which does not own the network infrastructure over which it provides services to subscribers. An MVNO will contract with an MNO to obtain bulk access to network services at wholesale rates and then set the retail prices independently. An MVNO may use its own customer service, billing support systems, marketing and sales personnel, or it could engage a third party.

Off-net

Describes the environment outside of an MNO's own network. For example, messages which are delivered Off-Net are sent from one MNO to a second MNO, either nationally or internationally.

On-net

Describes the environment inside an MNO's own network. For example, messages which are delivered On-net never leave the MNOs national or international group network.

Originating Mobile Operator; Originating MNO

The MNO at the beginning of the end to end message delivery chain which accepts messages from a messaging provider for onward delivery.

Originator

The term used to describe the number or word which identifies who a message is from upon receipt. It is also known as a SenderID. An alphanumeric originator enables a brand name to be set as the identified 'sender' of a message.

OTT (Over The Top)

Instant messaging services which are accessed over the internet.

P2A SMS (Person to Application)

Messages originated by a mobile subscriber and intended for delivery to a business, for example, a customer responding to a message received from an enterprise.

P2P (Person to Person)

This describes a channel whereby one mobile subscriber creates and sends a message to another mobile subscriber.

P2P Hub

See 'Hub'.

PRS (Premium Rate Service)

Services which enable mobile subscribers to pay for content, data services and VAS via their mobile phone bill or prepay account.

Reseller

A company which buys a product or service, repackages and then sell it as its own.

Phishing, SMS Phishing, SMiShing

The act of misleading a mobile subscriber by pretending to be a known and trusted party to gain access to online systems, accounts or data such as credit card, banking information or passwords for malicious reasons. Please refer to the MEF A2P Messaging Fraud Framework for more information.

Roaming

This describes an environment in which a mobile subscriber has left their home MNO network but retains the ability to access services without a break their connection by being connected to a visited MNO's network.

Reach

This is the breadth of coverage available in terms of how many mobile subscribers can be reached, for example, nationally, across multiple mobile operator networks or internationally. Reach may be determined by the types of connections available to a messaging provider.

GLOSSARY

Redundancy

This is the term for a secondary backup or fail-over route which assures the continuity of services in the event that an available connection fails for any reason. See also Availability.

Route, Routing

This describes the path that a message takes along an end to end message delivery chain, through different partners and connections.

SCCP (Signalling Connection Control Part)

A network layer protocol that provides extended routing, flow control, segmentation, connection-orientation, and error correction facilities within the SS7 Network. The SCCP relies on the services of MTP for basic routing and error detection.

SCCP Provider

A company which manages the SCCP layer protocol.

SCCP Global Title Faking

The act of sending a message in a way that deceives the terminating MNO about the true identity of the sender through the misuse of a Global Title. MEF A2P Messaging Fraud Framework for more information.

Service Provider

See Messaging Provider.

Short Code, Short Number

A special numbers, significantly shorter than a full 11-digit phone number, which can be used to send SMS and MMS messages.

SIM; SIM Card (Subscriber Identity Module)

A smart card inserted into a mobile device which carries a unique identification number, stores personal data and prevents operation of the device if removed.

SMS (Short Message Services)

A text messaging service component of phone, web, or mobile communication systems which uses standardised communications protocols to allow fixed line or mobile phone devices to exchange short text messages.

SIM Farms

A bank of SIM cards used to deliver messages for which the SIMs are not designated, for example retail SIMs intended for use by individual mobile subscribers which are instead used for the delivery of enterprise messages. Please refer to the MEF A2P Messaging Fraud Framework for more information.

SMPP (Short Message Peer to Peer Protocol)

A proprietary protocol used to send messages within the messaging ecosystem which can support non-GSM SMS protocols and is commonly used for the exchange of messages outside of the SS7 network.

SMSC (Short Message Service Centre)

An element within an MNO's network which receives messages from mobile network users (enterprise and individual mobile subscribers) and also stores, forwards and delivers messages to mobile network users, as well as maintaining unique timestamps in messages.

SRI (Send Routing Information)

This is the first of two SS7 requests generated by a SMSC when a message is being sent, the second of which is an FSM request. An SRI request is made by the originating MNO's SMSC to the HLR / VLR to request routing information and determine the IMSI of a mobile subscriber. Both an SRI and FSM request are required to send a message.

SMSC Compromise Fraud

The act of sending messages in a way that exploits an MNO's SMSC to relay messages without paying. MEF A2P Messaging Fraud Framework for more information.

SMS Malware

Malicious software which is installed on a device without the mobile subscriber's knowledge or disguised as an innocent app that acts silently in the background to disrupt connectivity, gain access to and gather personal or sensitive information, display unwanted advertising, or access a contact list to further spread the software. Please refer to the MEF A2P Messaging Fraud Framework for more information.

STP (Signal Transfer Point)

A router that relays SS7 Network messages between signalling end and signalling transfer points. STPs are typically provisioned in mated pairs to meet stringent reliability requirements.

Spam

A broad term for an unsolicited message, namely, one which is not wanted by the recipient, whether the message has been sent with good intentions or maliciously. Please refer to the MEF A2P Messaging Fraud Framework for more information.

GLOSSARY

SMS Originator Spoofing, Spoofing

The act of changing a message originator to someone or something known to the recipient to deliberately hide the sender's true identity. Please refer to the MEF A2P Messaging Fraud Framework for more information.

SS7 (Signalling System 7)

A set of telephony signalling protocols that enable the sending of SMS messages as well as performing number translation, local number portability, prepaid billing and other mass market services. SS7 is not permitted in some regions.

Telecommunications Technology Provider

A company which provides technological infrastructure to support the flow of voice calls, data or messages between different locations or companies.

Tier 1 Aggregator

A company which has a contract in place directly with a terminating MNO for the delivery of messages.

Tier 2 Aggregator

A company which has a contract in place with a Tier 1 Aggregator in order to connect to a terminating MNO for the delivery of messages.

Terminating Mobile Operator; Terminating MNO

The MNO at the end a message delivery chain, to which your customers are subscribed.

Throttling

The control and temporary restriction by an MNO of the flow of messages through its network to enable it to manage capacity effectively within its systems.

Traffic

A common term used to refer to the movement of messages, eg, "the [SMS] traffic has been successfully delivered."

Throughput

The capability that a MNO or aggregator has to carry a certain volume of messages across their infrastructure within a certain unit of time, for example, 300 SMS per second.

UCP (Universal Computer Protocol)

A standard for transmitting SMS over mobile networks.

USSD (Unstructured Supplementary Service Data)

A protocol used by GSM mobile phones to communicate with a messaging provider's computers.

VAS (Value Added Service)

Any non-core mobile services, namely, those beyond standard voice calls and messaging.

VLR (Visitor Location Register)

A database which contains information about mobile subscribers roaming within an MSC's location area. Its primary role is to minimise the number of queries that MSCs have to make to the HLR.

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ACCELERATING YOUR MOBILE OPPORTUNITY