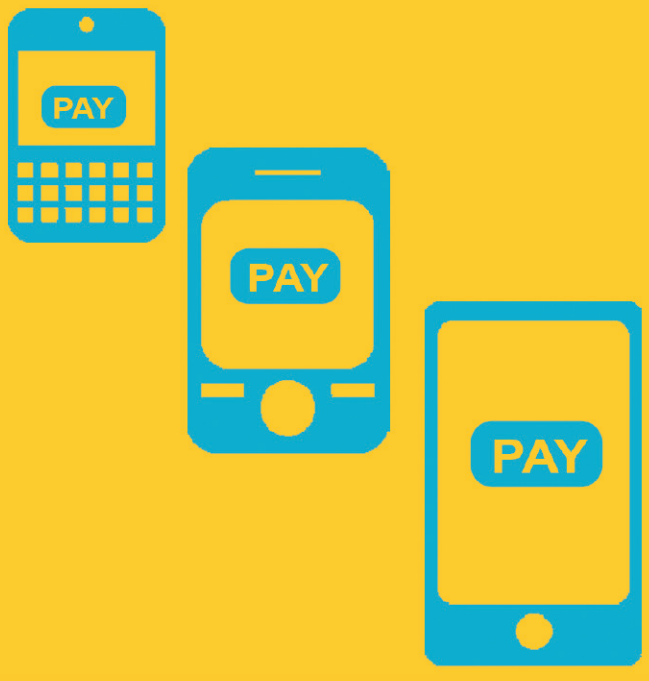
bango®

Direct Carrier Billing versus Premium SMS

Examining the crucial differences between these methods for billing content and services to mobile phone accounts



White paper

Contents

Executive summary

Direct Carrier Billing (DCB) is replacing Premium SMS (PSMS) as the method for billing content and services to mobile phone accounts. This Bango white paper explains why DCB has become such a powerful driver for the sale of digital goods and services on mobile and addresses the weaknesses of PSMS billing systems. It also explains why large content providers and app stores must harness DCB in order to access the wave of digital commerce that's been unleashed by the app store economy.

Available to all customers with mobile phone accounts, both pre-paid and post-paid, DCB provides a number of performance advantages over PSMS, ensuring that charge-to-bill delivers a better user experience than other payment methods. DCB also allows operators to reduce their exposure to risk and fraud in payment processing compared with their role as PSMS billing providers. This benefits the content provider by allowing them to manage all aspects of the payment process through DCB.

Content providers and app stores seeking to offer carrier billing will gain significant performance, time-to-market and reporting advantages by using the right partner to provide DCB. However, content providers need to analyze exactly what billing providers mean by the statement "Direct Carrier Billing". In many cases, this means no more than using PSMS to put charges on the phone bill. This paper explains why these types of service do not provide a good enough customer experience, and can increase fraud exposure.

Additionally, organizations should investigate how "direct" many of these services really are. In the PSMS world, many aggregators simply proxy through other, unknown third parties, increasing settlement risk and degrading performance. This paper explains these crucial differences so that content providers can ensure that integrating Direct Carrier Billing provides a low risk, high quality user experience for mobile payments.

Direct Carrier Billing – the Definition

When selecting a billing partner, it is important to understand what is meant by the phrase "Direct Carrier Billing". Many companies refer to placing charges 'directly' onto the consumer's mobile bill. However this is often achieved using PSMS and not a more reliable direct billing API. You should interrogate providers of carrier billing to find out what technology is used to apply charges to the customer bill. Verify if the connection and contractual relationship is between the payment service provider and the operator directly. Not only is "direct" a term that is misapplied to PSMS, in many cases both the connection and the contract are indirect, routing through one of many unknown intermediaries.

These solutions do not deliver the true benefits of DCB, in particular maximizing the payment success rate, lowering customer care costs and providing a high quality user experience. They are also highly restricted through regulation and subject to arbitrary suspension or shut down if PSMS shortcode problems arise in the territory.

All the major app stores that use carrier billing, mandate the use of true Direct Carrier Billing and will not connect to operators who only provide PSMS as their charging mechanism.

Only true DCB solutions support the following features:

Feature	Benefit
An API-based interface between the payment provider and operator platform	• Fast payment request response times • Delivers the best customer payment experience • Crucial for acceptable in-app billing experience
Direct server-to-server connection to each operator	• Minimizes latency, points of failure, problem resolution processes, etc. • Ensures the best possible customer experience
Comprehensive error messaging	• Provides guidance to customer if a payment cannot be processed. E.g. top up your pre-paid account, speak to operator care, try again or failover to an alternative payment method
2-phase billing option	• Mirrors credit card processing by allowing funds to be confirmed and reserved before payment is processed • This optimizes the payment experience and speeds up confirmation to deliver a superior customer experience
Comprehensive set of additional web services	• API calls to check customer status, identify red-lined accounts, retrieve price point availability and verify age if required • This reduces payment error rates to customers
Direct commercial contract between payment provider and each operator	• Delivers robust SLAs, fast financial settlement with minimal settlement risk • Gives a high quality developer experience

Background

Carrier billing systems currently collect payments worth around a trillion dollars ($1,000 billion) per year for voice and data services globally.

Every mobile subscriber has a billing agreement in place with the operator; either through a contract (post-pay) or by top-up (pre-pay). This provides an efficient and attractive payment channel for billing additional, third party products and services.

To tap in to this payment collection capability for third party content and services, two approaches are available:

1. Premium SMS (PSMS)

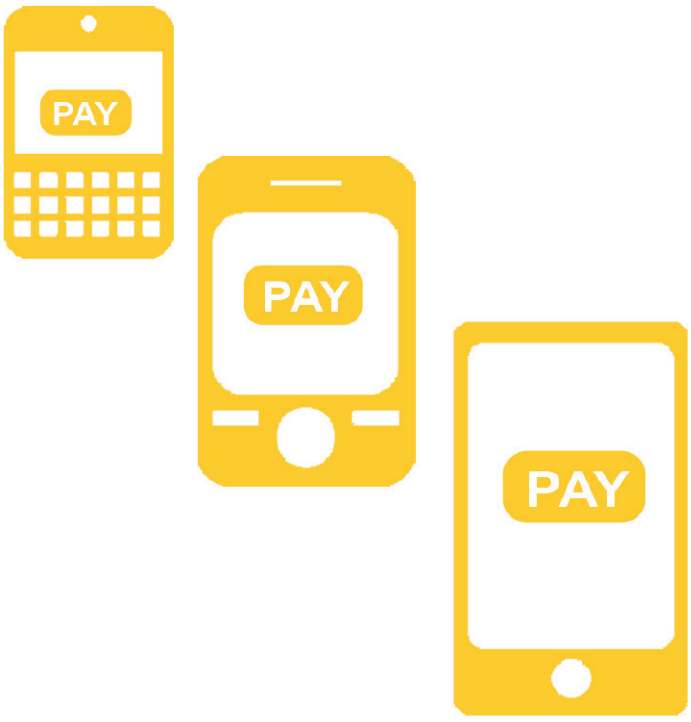
This method charges the consumer a fee to send, or receive, a text message in addition to their standard SMS rate. For example this may be $3.00, £1.50 or €2.00. Because these messages cost a premium fee, they are typically designated a special number (a 'shortcode', which is usually a 4-8 digits in length). A share of this fee is then paid to the third party providing the content or service. This approach is relatively simple to implement, and leverages the existing systems that already process the higher fees paid to send messages to or from other operators or countries.

PSMS has four main weaknesses which are explained in more detail later in this white paper:

1. Overcharging of consumers
2. Undercharging of consumers
3. Fixed price points
4. Incorrect or illegal tax treatment

2. Direct Carrier Billing (DCB)

Direct Carrier Billing (also known as Direct Carrier Billing or DCB) directly charges the consumer's post-pay mobile phone bill or deducts funds from their pre-pay account. It leverages programmatic interfaces directly into the mobile network operator's (MNO) billing platform, which requires additional security, management, reporting and third party settlement. These capabilities have been developed by many MNOs and additionally supplied by specialist companies such as Danal and Aepona. These DCB systems were initially used for the MNO's own content services (portals) but were made available to third party payment platforms, notably Bango, from as early as 2001.



Premium SMS background

Premium SMS became popular in the 2000's. Its 'user interface' was relatively simple to deploy using offline media. For example: 'text FROG to 88888 to get the crazy frog ringtone for £1.50' or 'text your birth date to 45676 and we will text you a daily horoscope for only 50cents – T&C apply, reply stop to stop'.

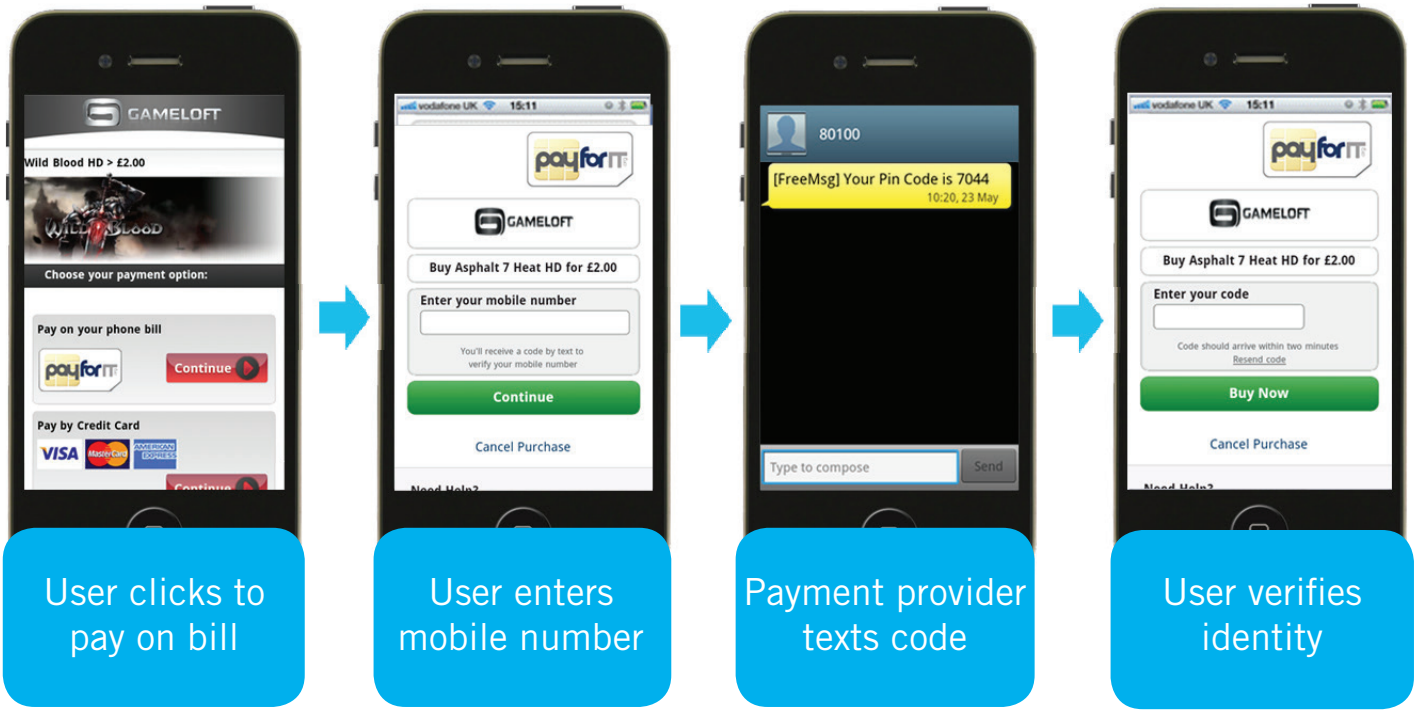
User identity / authentication was automatically included in the user interface (SMS), and therefore less complex. Companies such as Monstermob, Jamba / Jamster, Thumbplay and SendMe built substantial businesses by combining the ease of payment and use of PSMS with online marketing, especially by incentivizing users to take on PSMS content-club subscriptions, pay by message interactive chat / erotic services, television voting and lowest unique bid sales.

The desire to provide common technical and commercial interfaces for these primarily marketing businesses, across multiple operators and then multiple countries, led to the emergence of SMS aggregators, including mBlox, Mobile365, OpenMarket, Paymo (now Boku), Netsize, Echovox (now Zong / PayPal), Opera Telecom, txtNation and Fortumo.

Increasing problems with scams, user refunds, lack of clarity and other factors caused mobile operators in Europe, and increasingly in the USA to tighten up on the use of SMS messaging, introducing 'double opt ins', automatic refunds for customer disputes, mandatory notification for subscription renewals and severe penalties for high refund rates.

Premium SMS remains widely available, despite its commercial problems. The ease of rapidly collecting large volumes of small payments in many countries still outweighs the high costs and unreliability of the services. Particularly for products and services where the margins are relatively high and can therefore tolerate the built-in costs of PSMS as a billing method. It is a comparatively brittle technique for billing, often tied to a limited number of fixed price points, corresponding to pre-set PSMS billing tariffs.

Nevertheless a handful of global PSMS providers continue to exist, particularly for billing charges authorized from a PC or other premium messaging services.



Direct Carrier Billing background

Direct Carrier Billing was initially used by operator portals / decks (V-Cast, Vizzavi, Orangeworld) to charge for music, games and videos. The operators acted as the retailer, paying royalties to the content providers.

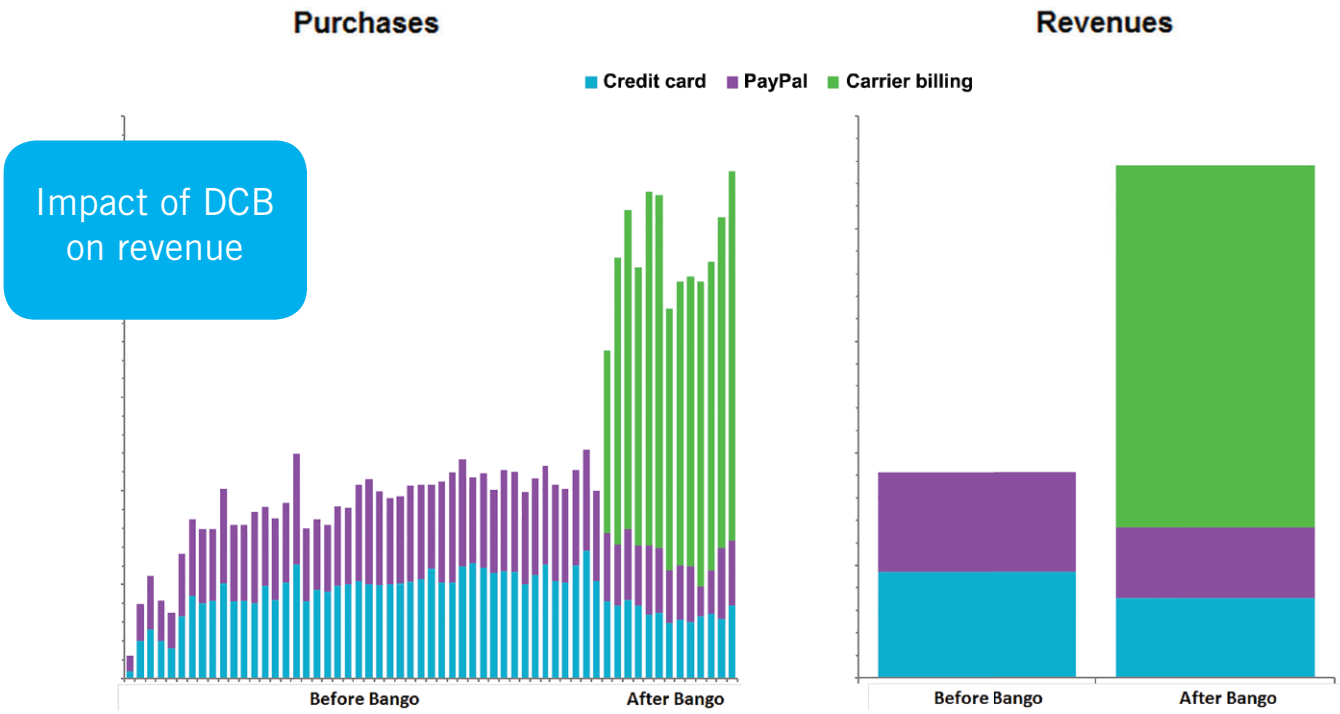
Starting in 2000, NTT DoCoMo provided its iMode billing services to selected third parties and this model was continued in 2001 when Telefónica opened its system to third parties in collaboration with Bango. Bango also assisted Vodafone in launching its m-Pay service in the UK, and was first to use AT&T (previously Cingular) DCB in 2004.

Mobile operators see their billing services as strategically important and have unsuccessfully attempted to implement cross-operator direct billing 'standards'. Most notably Simpay (2003-2005) and WAC (2010-2012). Recently, major MNO groups have aggregated their own 'hubs' to enable easier access to their group services across multiple countries – for example Vodafone GIG and Telefónica BlueVia.

Apple launched its App Store in 2008, with a 70% developer revenue share, and significant scale due to the large number of users of iTunes with registered payment details. This model puts pressure on mobile operators to improve commercial terms to allow such revenue shares. DCB was seen as a good way to enable this, because the major usability and consumer problems with PSMS could be overcome. Significantly, DCB moves operators into the 'payment processing' space, whereas PSMS remains a telephony service. Operators use DCB to reduce the role they are required to play in the settlement and accounting for charges processed through DCB.

While some MNOs have gained good experience with DCB and evolved their systems to accommodate customers, the majority of MNOs are in the early stages of deployment. Most operators are phasing-out PSMS as a third party billing method, and Bango expects this to have effectively disappeared as early as 2015 for third party charge-to-bill services.

The benefit of a good DCB system for app store billing can be seen in the graphic above by the impact on revenue from the day of launch.



Problems with Premium SMS

PSMS problem 1: Paying too much

With all payment models, when offering an app download or other service, the consumer is billed first. The biller then confirms the payment was successfully collected before the content can be downloaded.

With DCB, a direct interface with the billing system is used, so confirmation of payment is deterministic and a yes / no / reason response is delivered within a short time – typically around one second.

With PSMS a message is sent to the consumer from a specific shortcode that has an associated price point. The 'successful' receipt of the message by the consumer means they will be billed for the amount. In this case 'successful' means:

1. The consumer can receive the message (they are reachable)
2. They allow premium messages
3. Their device will accept the message
4. They have sufficient funds to pay for the message

If the product or service 'value' is provided within the body of the message, for example a horoscope, a one-use link to a download or a 'thank you for donating', then this mechanism for payment works well.

However, within an app or content store environment the product or service is delivered after payment has been attempted so a decision is needed about whether the payment worked prior to delivery. With in-app billing scenarios, the decision needs to be made quickly and that is a serious challenge for PSMS based systems.

Using PSMS to bill, the process normally involves:

1. Send the premium message
2. Wait for a 'delivery report'
3. If the delivery report is 'OK' let the user download the content

Unfortunately, step 2 proves problematic. Since text messages can take some time to be delivered, especially when handsets are not reachable, the messaging systems deployed are designed to store and forward. This means that while delivery reports can be quick, they often take many minutes and sometimes hours. Even where the user is known to be 'online' (they are using the operator network) and they have money (delivery report says 'OK') responses can take minutes or hours.

This means that a decision has to be taken within the payment experience regarding how long to wait for confirmation. Experience with UK mobile operators, using some of the most advanced SMS systems, shows:

- Waiting 5 seconds means 30% of delivery reports are not received
- Waiting 30 seconds means that 5% of delivery reports will not be received
- Waiting 12 hours still leaves 1% 'in limbo'

After waiting and not getting a delivery report the only rational choice is to decline the sale. Otherwise many users will get the content and ultimately not be billed.

However, a significant number of users will be told that they have not paid but in fact they WILL be charged and a delivery report sent after the 'waiting window'.

Some content providers take the view that if a consumer finds they have been billed after being told they cannot have the content they can just call up and get it – put it down to a 'glitch' – or perhaps the consumer will not call in which case the content provider gets paid with no content costs.

Taking 100 transactions with a maximum wait time in the user experience of 30 seconds means 5 users will be told the payment failed and denied the content download, however at least 1 of the 5 will have been successfully charged, that's 1% of all transactions. This is unacceptable to most quality brands and to most mobile operators. Typically brands and operators discover these issues through increased customer care calls.

Workaround: For some time, the UK mobile operator Telefónica O2 did not have DCB, and therefore it was necessary to use their PSMS system. To improve this solution O2 provided a facility to make the SMS messages used for payment 'invisible'. Nevertheless, the situation where a user could be billed for content they did not receive was possible.

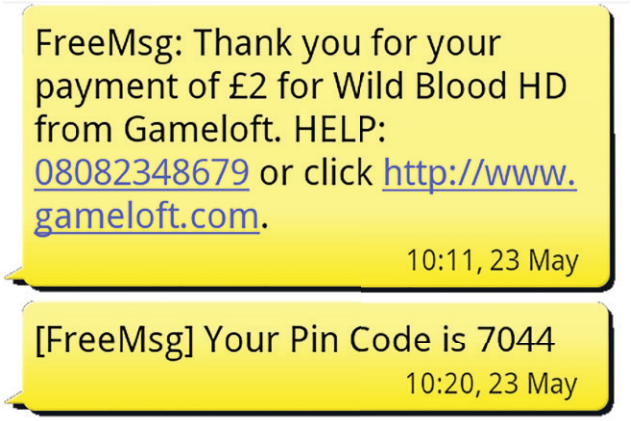
Bango therefore implemented a 'Trust' system for enabling 'microloans' of a specified amount – typically up to £2 ($3). These were made to users if a delivery report was not received after a period, (typically 10 seconds) determined by the user experience requirements. A 'loan' was made to the user to enable the purchase to continue, pending the arrival of a successful 'OK' delivery report. Such a loan was made to about 5% of users. Of those delivery reports arriving after 10 seconds, about half were confirmed within 24hrs and the remaining 50% failed after 24hrs – meaning 2.5% of users received content but did not pay.

After running this system for some months, delivering immediate 'no sale' to users that already had an outstanding 'loan', across all content providers sharing the same Bango database of purchase information, it was possible to reduce this to less than 1% of users getting what was effectively free content one time only – with no danger of overcharging. Potentially the 'loan' could be cleared by attempting to bill the user again later, or adding the amount to future attempts – but this was deemed unacceptable as a customer experience. O2 now provides a modern, high performance DCB system.

Waiting 12 hours for a delivery report still leaves 1% 'in limbo'

PSMS problem 2: Paying too little or nothing at all

A premium text message sent from a specified shortcode to a consumer theoretically makes the customer liable for the relevant payment. The MNO takes their share and remits the balance. Unfortunately this does not happen in practice for several possible reasons:



- ### Settlement time

  The link between a third party MNO billing system and the definitive carrier billing system may not be real-time, meaning that an 'OK' delivery report might be sent even though the consumer does not have funds. The settlement reports or messages delivered later may show that the user did not in fact pay – the delivery report is more of a 'probable payment'.

- ### False OK

  Some SMS aggregation systems have been known to generate spurious SMS delivery reports which turn out not to reflect the billing and settlement processes later.

- ### MNO price point error

  Carrier billing system processes have been known to assign the wrong price to a shortcode – frequently the set-up of billing codes is a manual process within the MNO team. If an error is made, and the consumer is undercharged, the MNO will not make up the short fall. If they are overcharged due the error, reconciliation is time consuming, and the content provider will have inadvertently breached charging regulations.

Workaround: The best workaround is to contractually link a 'confirmation that the user has paid' message to payment of the amount charged, except in the case of valid refunds. If a PSMS provider makes claims for the reliability of PSMS, or is prepared to 'cover losses' it is best to get them guaranteed in writing.

PSMS problem 3: The price point strait-jacket

The vast majority of MNO PSMS systems assign a price point to a shortcode. For example shortcode 88100 is a £1.50 shortcode and 88345 is £5.

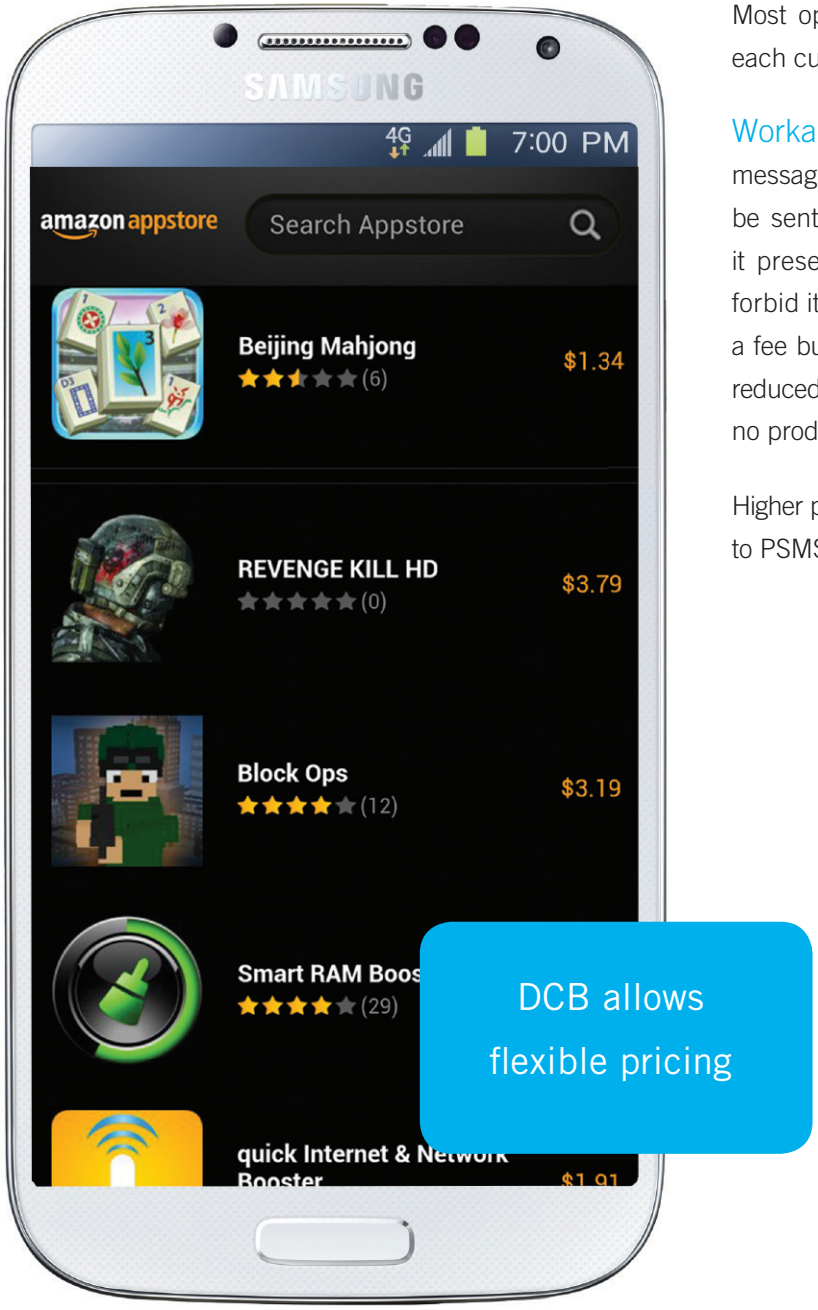
When the majority of promotion was done offline, this is not much of a problem, since the price would be stated on the printed material and there would not be many price points.

For app stores or services with a wide range of price points, and especially prices like $0.99, £0.97, €0.49 etc. or prices dynamically determined by exchange rate computations a very wide range of shortcodes are required.

Management of these shortcodes is complex and expensive. Most operators limit the number of shortcodes allowed by each customer, or charge per shortcode.

Workaround: A potential workaround is to send multiple messages, for example to charge $3 two messages would be sent, one for $1 another for $2. While this is possible, it presents major problems which cause most MNO's to forbid it. For example, the first message may charge the user a fee but the next may fail. Either the content is delivered for a reduced price or the user would be part-charged and receive no product.

Higher price points are usually available through DCB compared to PSMS, which is limited to a messaging based tariff.



PSMS problem 4: Incorrect or illegal taxes

A premium text message has the benefit of fitting inside the MNO's normal operating umbrella. However, this introduces a number of problems for the sale of apps or content:

- ### Wrong tax rate charged

  The user or sales tax assessed on a 'telephone message' may be different than the tax assessed on the content or service being delivered by the content provider. A good example of this is the case of a donation to a charity which is outside the scope of Value Added Tax but where the MNO charges VAT on text messages (E.g. http://www.domybooks.ie/2011/05/vat-and-charitable-donations-via-sms-text-message). The content provider may work out applicable taxes based on its tax nexus, only to find that the operator automatically adds tax on a PSMS billing route. DCB services are normally designed to handle tax more flexibly.

- ### Illegal tax rate charged

  In a number of jurisdictions, some services are federally determined to be exempt from state taxes. For example certain internet services, digital content or apps. If one of these services is paid for using PSMS, and the messaging portion of the user phone bill is liable to a state tax, an offence is committed.

- ### Inability to pass tax gross

  The majority of large content providers or app stores wish to be able to take the gross amount paid by a user and settle taxes according to their tax circumstances. These may relate to point of supply of service, taxability of service, destination of settlement or local nexus (or otherwise). Premium SMS services normally pay net of taxes, since the MNO will have already paid local taxes on the basis that a text message was sent. DCB can avoid this problem by being designed as a 'payment' service (aka Billing On Behalf of Others).

In most markets taxes must be included in the price at which a product is offered for sale. In Europe, VAT forms part of the advertised price point, so a product offered for €1.99 will include an element of VAT in that amount, which must be paid to a recognized national taxation authority. The tax 'nexus' can be selected by the seller, which is normally the party retailing the product (although note that Orange France has had to deduct and settle taxes directly with the French Government, a situation which it expects to resolve during 2013).

It is therefore possible for a higher rate of tax to be paid than is necessary, if a high taxation nexus is used.

Some app stores have overcharged customers in tax inclusive markets, by applying tax on top of the advertised cost of the product. This is also illegal, because the customer can only be charged the amount shown.

Finally, PSMS settlement operates as a telephony service, which means operators are required to account for sales taxes. It is therefore unsuitable for major distribution channels that wish to manage their own tax settlement processes.

Conclusions

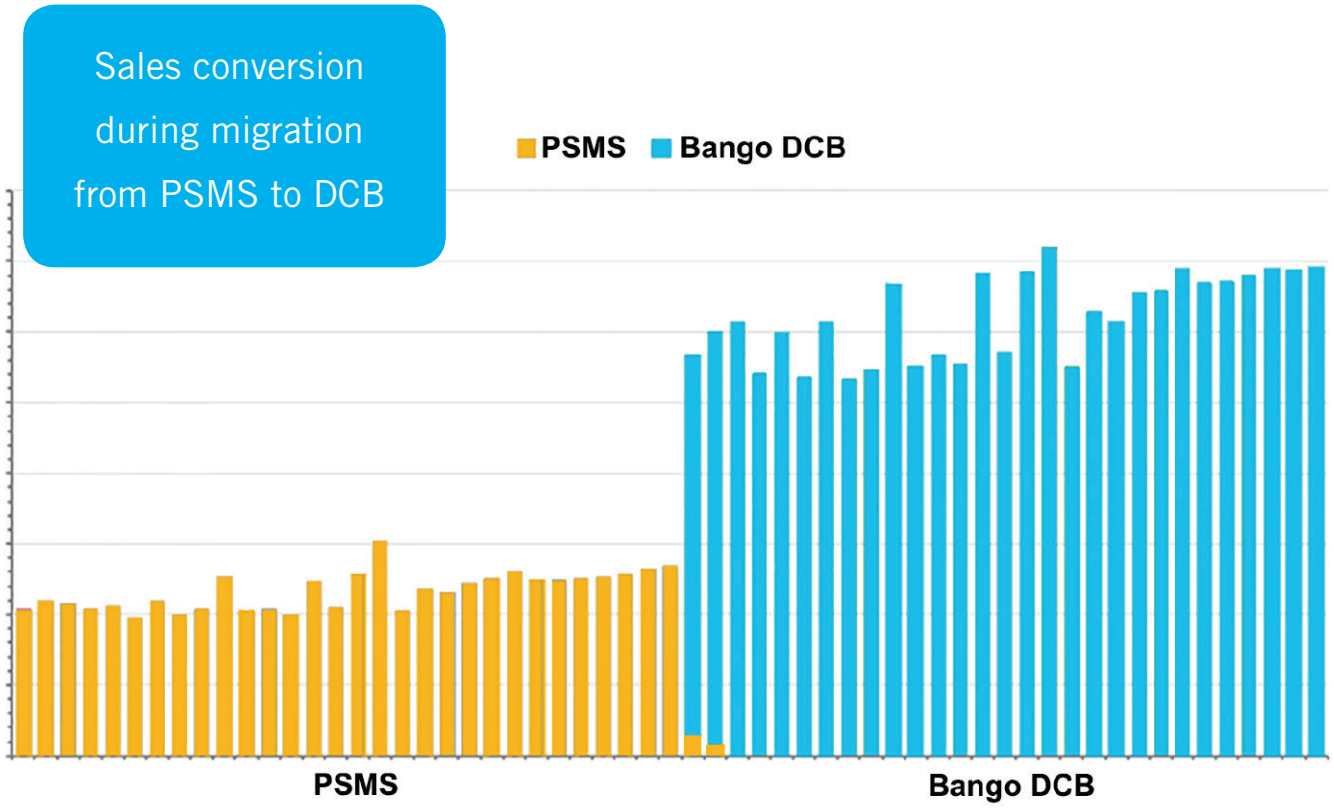
The use of Direct Carrier Billing payments is one of the main revenue drivers for the sales of digital goods and services.

Content providers and partners who want to capitalize on the pervasiveness of carrier billing should look to third party providers of mobile payment platforms, which already provide a single API to the global DCB opportunity.

The right partner platform will deliver charge to bill performance enhancements above and beyond what's achievable by connecting directly to each individual operator.

To ensure that conversion rates are maximized, with the best possible user experience, it is essential to ensure that your payments partner delivers DCB connections with each operator you plan to support. Premium SMS simply cannot meet today's expectation for a frictionless payment experience, and carries additional error risks.

Beware of a donkey wearing the saddle of a racehorse!



About Bango

In the era of mobile technology, collecting payments has emerged as a central and complex challenge. Bango powers payment and analytics on the mobile web, providing users with a massively smooth payment experience.

Bango's pervasive presence across the web creates a platform effect for partners, identifying hundreds of millions of users and maximizing the number of one-click payments. Global leaders plugging into Bango include Amazon, BlackBerry World, Facebook, Firefox Marketplace, Google Play, Windows Phone Store and major mobile brands.

For further information about the Bango Payments Platform visit: http://bango.com