The Mobile Cloud: Unlocking New Profits

by Brian Partridge | February 2011

Numerous Possibilities and Challenges for the Mobile Cloud

Is the sky falling or is the sky the limit? The entire mobile ecosystem faces limitless possibilities and challenges now and into the near future. Incredibly fast mobile networks giving us ubiquitous connectivity, iconic mobile devices enabling stunning yet simple user experiences, and unprecedented innovations created on the Internet have simultaneously coalesced. Mobility is essential to daily life; users are now demanding access to the Internet everywhere. The growing thirst for mobility impacts mobile network operators (MNOs), brands, advertisers, content owners and enterprises in fundamental ways.

For MNOs, the increase in demand for mobile data services is a double-edged sword. On one hand, they are gaining revenue to help offset losses in the voice business. On the other hand, explosive growth of data traffic is not corresponding with the linear revenue growth previously experienced. This results in taxed networks and puts MNOs in the uncomfortable position of enabling new services delivered via the Internet that benefit customers but don't necessarily pay off for those making investments in the network. In effect, they have been disintermediated from the value chain. For MNOs to succeed, they require new sources of revenue that expose the latent value of network investments and they also must remain realistic about where, how and when value can be added by new business models.

Yankee Group believes one major result of this transition, the mobile cloud, has the potential to change how we work, transact commerce, socialize and entertain ourselves in every conceivable way. Yankee Group defines the mobile cloud as a federated point of entry enabling access to the full range of capabilities inherent in the mobile network platform. The mobile cloud represents a virtual meeting point bringing brands, enterprises, mobile marketers, content and application owners, and developers together with an aggregation of several mobile networks. The goal is to provide a one-stop shop for stakeholders in the mobile ecosystem to unlock the full value of the mobile channel—to the benefit of all. The only problem is that, as described, it doesn't exist today. This paper explores efforts under way to build the mobile cloud.

The advent of the mobile era of computing offers equal amounts of disruption and opportunity for content owners, large and small enterprises, mobile marketers and brand owners. Five years removed from being just an afterthought, the mobile channel has moved from the bottom to the top of the value stack in terms of impact and potential influence. Google said it best at last year's Mobile World Congress event: "Mobile First," referring to its efforts to make application and search mobility the strategic center of everything it does. Enterprise IT managers must deal with the growing need for enterprise application mobility and the growing impact of consumerization, where personal productivity tools born in the consumer world, such as iPads, iPhones and Skype, are brought into the work environment.

For application developers, the mobile cloud is ripe with new opportunities, and they face significant choices about which platform they should target for development. MNOs sit on a veritable treasure trove of assets, but those assets need to be properly exposed in a wholesale or retail business model. In addition to having strong brands and existing billing relationships, MNOs can expose valuable user context, messaging, delivery assurance and QoS directly from the network in the form of APIs that address the entire spectrum of connected devices. While these new engagement models hold great promise, early efforts to build these ecosystems have remained niche in nature. Today, developers seeking true scale find affinity with Apple and Android developer environments, where the scale and reach challenges of 1:1 developer-to-network relationships are inherently overcome and commercial engagement models are favorable.

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Mobile Cloud Success Depends on Ecosystem Efficiency

Yankee Group is bullish on the prospects for the entire mobile ecosystem if stakeholders have the ability to work together more efficiently. MNOs must adapt to changing market conditions and view their network investments as an enabling platform, not just an engine of connectivity or vertically designed services. Failure to do so will result in lost profits and marginalized value chain positioning. For the mobile ecosystem to succeed, structural changes and new actors will be required. The industry needs capable stakeholders to step up and reduce the friction that currently stymies the creation of an efficient and profitable mobile platform. We need an improved model for the mobile cloud.

In this paper, Yankee Group:

- Explores the challenges facing MNOs, enterprises, content owners and developers in maximizing the latent utility of the mobile cloud.
- Reviews mobile industry efforts to overcome these obstacles to date.
- Provides key requirements for solutions aimed at solving mobile cloud challenges.
- Outlines the new mobile cloud solution offered by industry pioneer Neustar and enabled by service delivery platform (SDP) supplier Aepona.
- Explores what mobile cloud makes possible across the mobile ecosystem.
- Evaluates the risks associated with maintaining the status quo.

Mobile Ecosystem Complexity Presents Formidable Challenges

The challenges of bringing a mobile cloud vision to reality are diverse and span both technical and commercial hurdles. Bringing the relevant actors together has been attempted in the past, with some successes and more failures. Reconciling the requirements of MNOs, brands, enterprises and developers is critical in restoring harmony and efficiency. Today, everyone is speaking a different language and there is no universal translator. For this ecosystem to exist and thrive, all participants must fully understand one another's requirements.

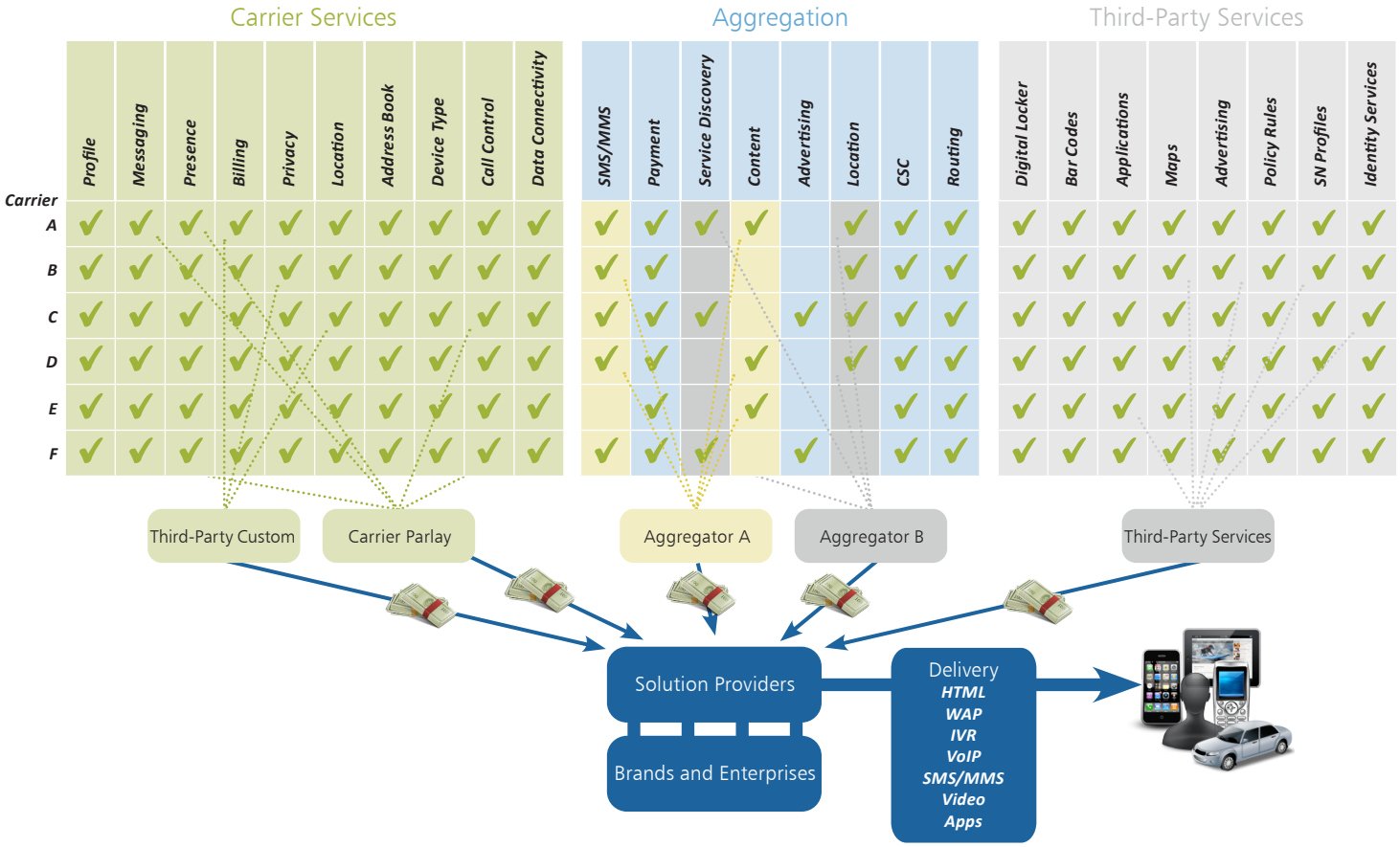
The mobile ecosystem is extremely complex (see Exhibit 1 on the next page). Developers, brands, enterprises, and content and application owners face a vexing mesh of avenues they must pursue to fully engage the mobile channel. This highly customized approach requires the support of many interfaces and technologies, with little opportunity for economies of scale.

Attempts to optimize these interconnections are mired in inefficiency. For example:

- **Application developers** that wish to access mobile network assets such as user billing, short-messaging service (SMS) and user location must integrate and contract separately among Networks A, B, C and D, which often use different APIs to expose assets, offer different commercial terms and offer varying support on major issues such as privacy controls and payment terms. Developers can choose to work with different types of aggregators, but these players tend to focus only on one aspect of aggregation—for instance, location—without providing access to all assets at once, so the issue of fragmentation is only marginally reduced.
- **Brands and mobile marketers** wishing to execute on mobile advertising campaigns must work with individual aggregators and expend valuable resources in content formatting to ensure the greatest possible chance for delivery based on the fragmented network channels and device landscape. Often, these challenges weigh down the potential ROI of engaging customers via the mobile channel—especially at the individual MNO level, where scale and reach is often a barrier to viability. The veritable gold mine of subscriber context contained within a single MNO is often out of reach for brands and mobile marketers due to MNO corporate policy that denies exposure, lack of readily consumable APIs to expose such information or regulatory intervention. As a result, frustrated mobile marketers have become eager to circumvent MNOs by engaging customers at the IP layer via the mobile Internet, resulting in significant lost opportunity for both sides.
- **Content owners** are faced with a similar challenge in terms of maximizing the reach of their valuable content. Beyond the challenges of working with a mishmash of different aggregators, MNOs and additional third parties, content owners are overwhelmed by the complexities of rendering content across tens or hundreds of different network types and the potential for thousands of different devices. Content owners are being stifled because they can't access the mobile platform from one centralized location.

Exhibit 1: The Complex Mobile Cloud Ecosystem

Source: Yankee Group and Neustar, 2011



The complex array of players and options means many interfaces and technologies to support.

- **Vertical enterprises** wishing to adopt mobility as a way to enhance productivity within their operations are often left frustrated when directly engaging with MNOs. Unlike service providers that work with MNOs on a daily basis, enterprises often find it challenging and frustrating to navigate through MNOs' organizations and operational requirements.
- **MNOs** may not understand the most efficient ways to expose the value of their assets and, at the individual MNO level, they may not be able to build a value proposition due to limited scale and reach. Many MNOs also remain too steeped in the "old world" of telecom and fail to grasp the rate of innovation and underlying business models that make the Internet economy so robust. Yankee Group believes MNOs have an opportunity to get in front of the dumb-pipe pack and position themselves as active participants in the mobile cloud, rather than incidental enablers. To achieve this, they must climb out of the fiber trenches, leave behind the hand-to-hand combat of fixed monthly service pricing and build a new network reality.

We explore some of the industry efforts to overcome the challenges outlined above in the next section.

The Mobile Industry Comes Together To Target Long-Tail Applications

The mobile industry is aware of the challenges it faces regarding MNO-to-developer dynamics. In fact, industry groups such as the GSM Association (GSMA) and the Wholesale Applications Community (WAC) have put forth commercial and technical models in an attempt to reverse some of the constraints that have caused developers to ignore MNOs as a viable platform for development. Developer ecosystems are at the top of every MNO CEO's strategic to-do list as a result of Apple's and Android's startling success with their application stores and their burgeoning mobile application developer ecosystems.

The GSMA's OneAPI initiative, announced at Mobile World Congress in 2009, aims to recommend a set of common network-facing APIs, using Parlay X on the network side and commonly understood Web services-based programming models, like RESTful and SOAP, that developers can easily access and use. Network-facing APIs give developers access to MNO functions like subscriber information, calling and messaging capabilities, billing, location and presence.

OneAPI should not be confused with device-centric standardization efforts such as Joint Innovation Lab (JIL) and BONDI that revolve around widget-based device APIs and have been the initial focus of WAC. OneAPI potentially fits together with WAC as the network-facing API scheme of choice. Initially, however, WAC has focused on handset APIs for mobile applications.

The high-level value proposition for application developers is they gain a one-stop access point to millions of subscribers through a standard interface and a simple, easy-to-understand commercial model—without experiencing any of the previous hassles. For MNOs, OneAPI and WAC represent accretive revenue opportunities because they unlock valuable MNO assets via API structures. These models have the potential to get MNOs back into the mobile application revenue stream, provide customers with more application choices and further monetize network investments.

How It Works: OneAPI Canadian Trial

The GSMA chose to execute a commercial trial of OneAPI with three Canadian MNOs: Rogers, Telus and Bell Canada. For the pilot, the GSMA collaborated with Aepona, which provides an SDP for Parlay-X-driven Web services. Aepona also provides the essential functions for an aggregated API service, including harmonized exposure of network and payment APIs, a partner portal, multi-party settlement, partner management, policy control, routing and privacy management.

The GSMA offered a single contract and common pricing for the use of OneAPI across all three MNOs as part of the pilot, and it also provided the billing and payment services between the developers and the MNOs.

In addition, the pilot used PathFinder, the GSMA's ENUM-based number translation service operated by Neustar, which allows for number portability and helps determine which MNO should receive the OneAPI call. PathFinder presents a repeatable way of supporting number portability in any OneAPI deployment, and because it is a global number registry, PathFinder will enable the rapid rollout of OneAPI into different markets around the world.

We believe the GSMA and WAC initiatives are positive steps; they address the network- and device-facing interfaces by catalyzing ecosystem scale and take significant steps forward in addressing the commercial fragmentation that previously stood in the way. However, many alternatives—from device manufacturers, MNOs, aggregators, specialists and so on—are fighting for developer attention in the marketplace, so OneAPI and WAC face competition for mindshare. Elements from WAC and OneAPI likely will be adopted within different public and semi-private models.

That said, Yankee Group believes a more complete solution is required that addresses the entire ecosystem, including brands, marketers, content owners and enterprises. We outline these requirements in the following section.

Mobile Cloud Solution Requirements

Yankee Group's vision of the mobile cloud is a model that facilitates the connection and abstraction of a number of MNO networks inside a cloud-based cross-network service. A key advantage of this deployment model is that most end-users/subscribers in a given country or region can be reached and billed from a single point, using a single set of APIs, under one commercial agreement. This negates the need for application developers and enterprise solution providers to enter contractual agreements with every MNO in a region. This model must include:

- **Privacy management**. Seamless handling of each stakeholder's specific policy and privacy management requirements is extremely important. A breach of privacy could have potentially devastating effects and risk damaging an actor's brand and revenue potential. The mobile cloud requires a neutral third party to provide a diverse set of offerings, as well as immediate remedies and protections should a privacy issue arise. **Level of importance:** Very high
- **Uber-aggregation**. The mobile cloud must support the ability to deploy content and applications across multiple MNO networks under a single commercial agreement and point of integration that provides access to the full range of mobile platform assets, including subscriber intelligence and billing. Today, the industry lacks a centralized point where brands, developers and MNOs can go to exchange value around APIs. Without this central, neutral party involvement, there is a lack of confidence among one or more groups of stakeholders. **Level of importance:** Very high
- **Cross-network asset exposure and integration**. MNO network assets historically are locked into service silos and have been difficult to expose, either due to regulatory fiat or strategic decision. Regardless, the result is MNOs have developed distinct cultures within these silos that may clash when forced to work together. These silos must be broken down and cross-network interaction must be enabled for all stakeholders to gain the benefits of exposed assets via APIs. Simple APIs offering transparent access to mobile services and requiring no specific knowledge of underlying network technologies are imperative. **Level of importance:** Very high
- **Diverse commercial model support**. To reach the point where the benefits of exposed network assets can be realized, a commercial model must be developed that is advantageous to all members of the ecosystem. Too often, current models are stilted and don't provide enough incentive for one party to participate. The mobile cloud must provide the flexibility to support a variety of commercial models based on revenue sharing, API transaction volume, data volume and combinations of all three. **Level of importance:** Very high
- **Strong reporting and analytics**. The mobile cloud introduces new complexities in how revenue is parsed among different stakeholders. The ability to access timely and accurate information on API utilization, application usage, network utilization and uptime/downtime is critically important in providing a full picture of value to the consumers of a network resource. Reporting and analytics are also valuable in planning for expansion or upgrade of relevant network and IT systems. **Level of importance:** High
- **Industry expertise**. MNOs have not been successful in selling high-value solutions to enterprises and brands, likely due to a shortage of sufficient domain expertise across multiple vertical industry segments. While scaling to the needs of MNOs, this approach ultimately fails because it does not match the unique requirements of either enterprises or brands. Instead it leads to confusion and frustration when setting commercial terms. **Level of importance:** Medium

Yankee Group has identified two potential actors in a position to step into the role of mobile cloud service provider. These are familiar names to anyone who has experience working in the telecom industry: Neustar and Aepona.

Neustar and Aepona Step Up to the Mobile Cloud

Solution Background

Neustar has been actively working on assembling the network and human assets and real-world experience required to step into the role of mobile cloud service provider for the past several years. Today, Neustar plays an important role in the telecommunications industry by reducing complexity and providing seamless connection of its MNO customers' diverse networks. It does so through its set of unique databases and system infrastructure in geographically dispersed data centers, while also enhancing the capabilities and performance of its customers' infrastructure. Neustar operates the authoritative databases that manage virtually all telephone area codes and numbers, providing numbering solutions and number portability among the carriers in North America. Neustar also facilitates order management and work flow processing, and allows MNOs to manage and optimize the addressing and routing of IP communications.

For its part, Aepona provides the software engine that powers the convergence of open mobile networks, mobile cloud computing, on-demand enterprise solutions, and Web and mobile applications, opening up new low-friction commercial channels between multiple diverse industries and vertical market segments. Aepona's solution, when deployed by either MNOs or cross-network mobile cloud providers, makes it easy for enterprise solution providers and Web or mobile application developers to enable a wide variety of applications and services, enriching them with powerful mobile network features and intelligence available on-demand via the mobile cloud.

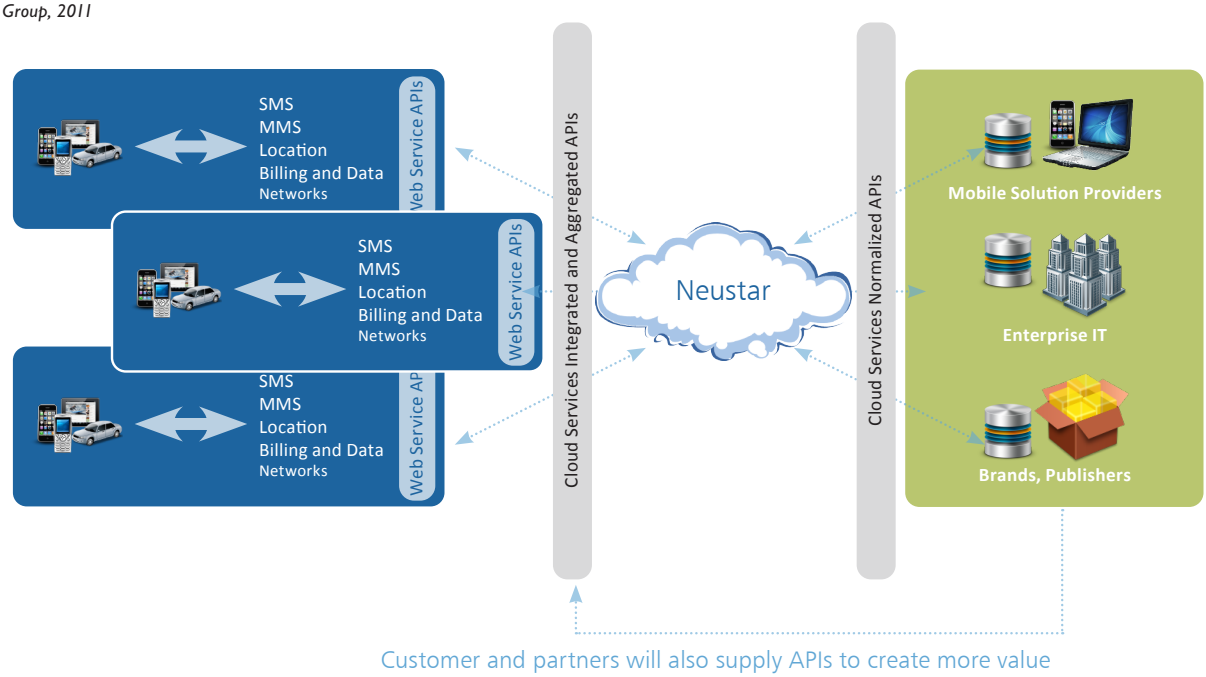
These two industry players are now presenting themselves as the potential service layer required to address the challenges outlined in this paper. Both companies have histories of addressing similar issues surrounding technical and business model complexities inherent in the telecom ecosystem. Now they are joining forces to address the challenges facing the entire mobile ecosystem.

Solution Attributes: Neustar Intelligent Cloud Service

Neustar is aiming high with its managed service offering, Neustar Intelligent Cloud, which targets enterprises, brands, mobile marketers, content and application owners, network owners, solution providers and developers. It aims to provide a one-stop shop that integrates multiple networks' APIs with one commercial agreement. Initially, Neustar will target actors seeking to maximize the mobile experience in the U.S.; it plans to expand into additional regions over time. Neustar seeks to build a platform that maximizes exposure to context-enriched mobile services, and it is using Aepona to provide the underlying SDP to power the system (see Exhibit 2).

Exhibit 2: Neustar's Intelligent Cloud Targets Ecosystem Complexity

Source: Yankee Group, 2011



The Neustar solution comprises the following key building blocks:

- **Privacy management**. Third-party application developers and enterprise solution providers that use mobile cloud services to obtain information about an individual subscriber must have explicit consent from that subscriber to do so. Neustar and Aepona offer a centralized user consent management feature that affords mobile ecosystem participants and MNOs the assurance that consumer privacy rules are not being breached. Aepona's solution exposes a privacy management interface, which applications must use to determine if they have a user's consent prior to, for example, attempting to locate them. Neustar has built its reputation in the telecom industry partly through its commitment to maintaining secure and private connections.

- **Mobile intelligence and discovery services**. Leveraging its cross-MNO integration capabilities, Neustar will provide look-up functionality to connect the right services to the right network at the right time. The Neustar/Aepona solution integrates with a subscriber identity database to first determine the home network of a given user prior to delivering service. This is achieved through an ENUM look-up facilitated by Neustar, based on the provided MSISDN (or MDN). The ENUM database then returns a specific service provider ID, which identifies the home network of the subscriber. Mobile intelligence also includes exposure of key mobile user context information such as location and presence, demographic data, device profile and billing plan. By aggregating these capabilities in one place, mobile marketers, content and application owners, and enterprises can tailor their mobile offerings and offer a truly optimized mobile experience at a scale that was difficult or impossible to achieve before.

- **Cross-MNO services**. Cross-MNO abstraction and routing of key messaging services such as SMS/MMS is another key building block of the Neustar managed service. The APIs being exposed to third parties need to be MNO- and subscriber-independent, and it is therefore the platform's task to route requests to the appropriate MNO and to mediate protocol conversion where necessary. This applies equally to network and mobility features as it does to payment services. Some network capabilities are subscriber-independent or partially independent: These include SMS/MMS and voice-call setup. Others can only be handled by the subscription network of the end-user, including location, presence, subscriber information and, of course, payments. Advanced capabilities include geofencing, which can be exposed to deliver services as users enter a specific pre-determined location. Billing for services can be set up in a variety of ways, including direct to MNO, direct to application provider or various shared or indirect possibilities.

- **Reporting and settlement**. Neustar's mobile cloud service provides the granular reporting and analytics required to meet the customized needs of each actor in the mobile ecosystem. Content providers will be able to understand the demographics of users accessing their content, while MNOs will understand what content is most popular. The problem of cross-network settlement is somewhat complex as we look at the business models in play between MNO, mobile cloud provider and third-party application provider. Neustar accesses wholesale network services from the various MNO networks connected to the mobile cloud service, and these services are then resold to third parties. In turn, application providers are charging users for goods and services directly on their mobile bill, in which case the funds collected must be apportioned correctly to each party in the revenue chain. The success of any mobile cloud is predicated on having a low-cost, automated mechanism for processing these settlement transactions appropriately for each party.

- **Value-added services**. Neustar also brings a compelling mix of value-added services into the mobile cloud by offering such assets as a 2-D bar code clearinghouse and short code campaign management capabilities. The implications: More mobile brands and marketers have access to a full suite of innovative mobile channel delivery options that span across all MNOs and devices. Neustar also offers additional services such as digital content lockers and content management and delivery assurance.

Mobile Cloud Opportunities Span the Entire Mobile Ecosystem

The creation of a functional mobile cloud presents several opportunities; maintaining the status quo, however, involves risks to the entire mobile ecosystem. The possibilities and risks to each segment of the ecosystem are detailed below.

MNOs

Possibilities: Mobile cloud APIs offer the opportunity for individual MNOs to implement a multi-sided business model consisting of traditional, end-user subscriptions as before, but now augmented with revenue generated directly from the exposure of their network and billing assets to third-party organizations. Participating in the mobile cloud ecosystem in a wholesale fashion complements existing developer ecosystems focused on retail consumer and enterprise services. By combining MNOs' own network-as-a-service strategy with the cross-network benefits of a centralized mobile cloud computing platform, MNOs can adopt an "Embrace and Extend" strategy. For instance, an individual MNO may choose to embrace the centralized model for common network enablers such as location, messaging and payment, where there is a clear need for centralization to attract a critical mass of developers. But it may also choose to extend the available enablers with its own unique additional capabilities to provide differentiation.

Embrace and Extend strategies leverage a centralized cross-network platform and allow an MNO's developer partners to access cross-network APIs from its portal. This affords a much wider scope than previously possible, with new routes to previously untapped markets and new revenue opportunities.

Risks: Failing to expose network assets to a mobile cloud provider limits an MNO's value in the mobile ecosystem. Failure to act for any but the largest MNOs in the world also ensures marginalization of a value chain position in any wholesale model targeting developers, content owners and enterprises. Retail and vertically specific application development may still be possible, but it will likely lack significant scale and revenue impact.

Risk Level: High

Developer Communities

Possibilities: Tapping the mobile cloud empowers application developers to differentiate their apps with mobile network features and allows them to reach and bill their maximum potential customer base. The mobile cloud makes it easy for developers to enrich their apps with valuable mobile network capabilities and intelligence and provides a new direct-to-bill monetization channel for their applications. A mobile cloud service can help developers increase sales conversion rates, reduce time to market (and, by association, to revenue) and realize a low-friction upsell path through in-application billing.

Risks: The risk of doing nothing is potentially less for developers if they are already running a successful business working directly with device OEMs, such as Apple, or OS vendors, such as Google. Developers that ignore a well-run mobile cloud, however, risk losing out on market channels that can be added with limited incremental cost via a one-stop-shop solution. Perhaps most importantly, they miss out on tapping MNO billing relationship capabilities. Developer risk is mostly related to reach maximization.

Risk Level: Low/Medium

Consumer Brands

Possibilities: In a mobile cloud model, brands can access network enablers and subscriber context that were previously unavailable through the traditional multiple MNO/multiple developer ecosystem. This removes barriers in terms of extending and expanding the brand across multiple mobile devices and MNO networks. With access to a broader range of mobile subscribers, brands can also capitalize on richer subscriber data across multiple geographies, allowing for more informed and targeted campaigns. Finally, brands can access innovative new payment models, such as in-app payments for products and services.

Risks: For consumer brands, the risks of not acting will grow more profound over time. The mobile channel is becoming increasingly important as eyeballs flock toward mobile devices and usage time continues to rapidly increase. Brands engage the mobile channel in a variety of ways, primarily in specific silos such as text messaging campaigns working with SMS aggregators. The mobile cloud model offers the potential to dramatically increase the impact of their branding when measured against dollars and time spent developing the technology and partnerships to execute on mobile campaigns, advertising and applications.

Risk Level: Medium

Vertical Enterprises

Possibilities: A mobile cloud allows vertical enterprises to improve customer service, increase employee collaboration, enhance business processes and drive productivity gains. By providing streamlined, on-demand access to mobile network intelligence and communications across multiple MNOs, the mobile cloud enables a wide variety of business solutions such as field force automation, communications-enabled business processes, CRM and employee collaboration.

Risks: The risks of not engaging with the mobile cloud may not be as significant for enterprises, but they run the risk of falling behind their competition or losing out on potential productivity gains. Forward-thinking enterprises are already embracing mobility rather than fighting it. The mobile cloud's impact is particularly strong for enterprises that can leverage network-based subscriber context to increase work flow efficiency—for instance, enterprises managing fleets of assets, mobile businesses such as insurance adjusters, etc.

Risk Level: Medium

Mobile Cloud Engagement Model Example

From the subscriber point of view, the fact that a solution is based in the mobile cloud means nothing—all users see is a far more compelling and interactive experience from brands and MNOs. From an MNO, developer and brand perspective, many separate components are integrated and barriers to offering such dynamic real-time services are lowered.

Exhibit 3 on the next page illustrates the type of multi-channel, multi-player, multi-payment experience made possible by a mobile cloud-based API platform. The sequence of subscriber events moves seamlessly from mobile coupon opt-in, to location-based services, to 2-D bar code generation and delivery via SMS or MMS, to coupon redemption, to digital content delivery and digital rights management.

For the consumer, this is a logical and intuitive augmentation of the retail experience, fulfilling the expectation afforded by the networks and handsets of today. MNOs, developers and brands capitalize on this integrated sequence of events with new revenue streams from subscription services, one-time pay-per-use and revenue share on executed transactions, such as redeemed coupons.

Exhibit 3: Mobile Cloud Possibilities for Enterprises and Brands

Source: Yankee Group, 2011

		Cloud Enablers Used	Monetization
1	Customer opts in to receive location-based mobile coupon from retailer. 	Permissions Management	Monthly service fee based on transaction volume or pay per use
2	Customer enters geofence close to retail store. 	Location/Geofencing API Policy Enforcement	
3	Neustar notifies retailer's campaign manager to send location-based, personalized coupon. 	User Profile (Operator and Neustar) + Buying History (Retailer)	
4	Neustar delivers mobile coupon for $25 off new tablet device. 	2-D Bar Codes SMS or MMS Policy Enforcement	
5	Customer redeems coupon in-store. 	2-D Bar Codes Location of Store	Revenue share on coupon redemption and purchase completion
6	Several days later, customer receives message with promotion and purchase link to digital video. Customer charges to invoice and transfers to digital locker. 	SMS Payments and Settlement Digital Rights Locker Registry	

Conclusion: The Sky Is the Limit If the Mobile Ecosystem Can Work Together

The emergence of cloud computing and its extension into the mobile domain creates the potential for a global, interconnected mobile cloud that will allow content providers, developers, mobile marketers and enterprises to access valuable network and billing capabilities across multiple networks. Mobile cloud services can make it easy for the entire mobile ecosystem to enrich their services with mobility—whether these applications run on a mobile device, on the Web, in a software-as-a-service cloud, on the desktop or on an enterprise server.

A well-executed mobile cloud service eliminates the commercial and technical fragmentation that has thus far proven to be a barrier to successful collaboration between content providers, developers, mobile marketers, enterprises and MNOs on a regional or global scale.

To realize the global mobile cloud, cross-network mobile cloud providers are well-placed to take on the role of providing standardized, harmonized interfaces toward telco capabilities across multiple networks. Mobile cloud service providers offer a single point of access for application provider registration, provisioning and support, centralized payment and settlement, policy control, routing, security and privacy management. Combine mobile cloud services with a motivated ecosystem, and the possibilities are endless.

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