

# Driving the Application Explosion

## Implications for network providers – challenges and recommendations

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The past 18 months have seen an explosion in the number of applications that are available to end users — mobile applications, widgets on TVs and PCs, as well as enterprise applications of all types. As end users discover how to use their connected devices in new and innovative ways, they have demonstrated an almost insatiable appetite for applications. The question for network providers is how to capitalize on this opportunity in an effective and sustainable way.

This paper discusses the current trends, challenges, and success factors for network providers seeking to add value in application delivery. Among the challenges, the most significant are: 1) difficulty in justifying the business case; 2) legacy mindsets and organizational structures, 3) adherence to legacy partnership models that limit innovation opportunities, 4) inefficient processes that cannot deliver applications in a rapid and cost-effective manner, and 5) issues with fragmentation from the developer perspective. The combined effect of these challenges is that network providers may not be optimized for efficiently providing a broad array of applications to their customers. From our research and experience, Alcatel-Lucent has developed concrete recommendations to help network providers capitalize on the application opportunity. Specifically, we recommend: 1) building a holistic business case; 2) exploring new business models; 3) industrializing operational processes; and 4) lessening fragmentation to achieve scale. Though recommendations are provided, they are offered with the recognition that suitability/applicability will vary based on each network provider's unique situation. Alcatel-Lucent stands ready to support our clients in selecting and implementing an individualized path to success.

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## 1. Introduction and overview

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Mobile phone customers around the world are learning through Apple's App Store marketing communications that "There's an app for that." And it's noteworthy that in the vast majority of cases that application or "app" has been made possible by moving towards more open application development. This is a new paradigm where applications are brought rapidly to market in greater numbers and greater variety by a wider range of developers.

At the same time, as customers increasingly want the full "open web" experience across all their connected devices (e.g. mobile devices, TVs, and of course PCs), the threat of disintermediation for network providers is growing. This is a scenario where customers build direct relationships with third-party service and content providers — and the role of the network provider is commoditized.

For operators to remain an integral part of the value chain, they will need to build a successful and sustainable position in the emerging ecosystem through more open and agile application enablement.

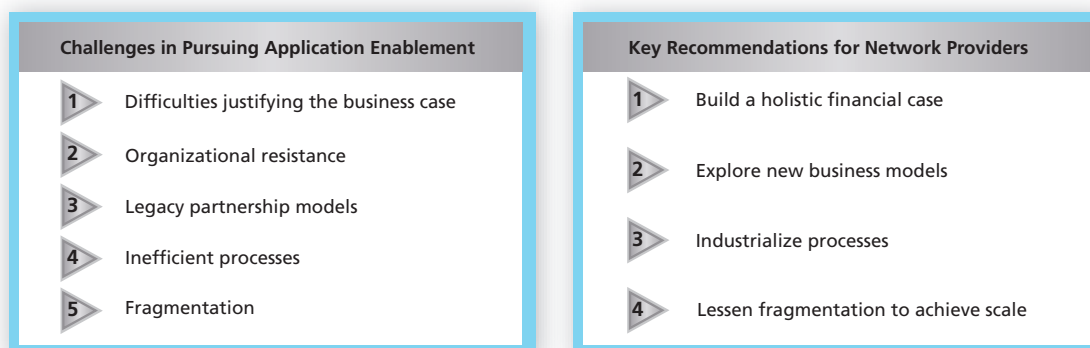
Application enablement is an industry vision and network approach that combines the trusted capabilities of network providers and the speed and innovation of the web to provide end users and enterprises with a richer and more robust experience. Application enablement is founded upon the High Leverage Network™ and a secure and controlled ability to selectively expose key network provider assets (e.g., centralized billing, messaging, security, quality of service, presence, location, customer information) to in-house developers, trusted partners, or a broader third party developer community. To leverage these unique capabilities most fully, network providers can utilize a service exposure approach for more efficient app development as well as collaboration with third parties. Complementary to this model, is the requirement to transform current service/application development and onboarding\* processes to add agility (i.e., speed and flexibility) and efficiencies. Fostering more flexibility, re-use and collaboration — supported by improved processes — places network providers in a more central role for driving the application explosion.

Reflecting Alcatel-Lucent's research and ongoing experience with enabling applications, this whitepaper will provide answers to the following key questions facing network providers:

1. What are the challenges that network providers can expect to encounter in this space?
2. How are network providers currently addressing application opportunities and changing value chains?
3. How can these types of obstacles be resolved?
4. What are the key underlying business models, value propositions, and options that will position network providers for success in this space?

**Figure 1. Summary of challenges and key recommendations**

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\* Onboarding is a term borrowed from Human Resources and is initially associated with bringing new employees into a company. Now, the IT, Content and Communications industries refer to "onboarding" as the assimilation of new partners, applications, content and service components into their environment.

Figure 1 summarizes the main challenges and key recommendations that are emerging from research in this area. These topics are covered in greater detail in the following sections.

Though mobile examples will predominate in the forthcoming discussion, these trends and their implications for network providers are not specific to the mobile arena. This paper will draw on non-mobile examples and case studies to demonstrate the relevance of application strategies for all network providers (e.g., including wireline, cable). Looking ahead, as network providers explore and develop converged networks, impacts seen in the mobile area will become increasingly pertinent across all network technologies.

## 2. The application landscape

In the last two years, we have seen an explosion of application initiatives across a wide variety of industry players. Device manufacturers, O/S vendors, network equipment vendors, and network providers have added to the growing list of application storefronts, developer communities, and developer platforms. This section focuses on how network providers are addressing the opportunities and risks of this exploding marketplace. Examples of network provider initiatives are listed below.

Figure 2. Examples of current and planned network provider initiatives

NETWORK OPERATOR	INITIATIVE
3	Skype partnership
AT&T	Synaptic Hosting
AT&T & Jasper Wireless	M2M
BT	Ribbit
Clearwire	Clear Innovation Network, Clear
Deutsche Telekom	Developer Garden
Mobilkom Austria	Fring partnership
O2	Litmus
Orange / France Telecom	Orange Partner
SK Telecom	T-Store
Sprint	Solution Launchpad
Telenor	Telenor Playground, Content Provider Access, Mobilt Bedriftsnett
Telstra	T-Suite SaaS
TIM	Next
Verizon	Open Development, Private Network
Virgin Media	BBC iPlayer partnership
Vodafone	360, Music Station / Omnipone, Applications Service
Vodafone, Verizon, China Mobile, Softbank	Joint Innovation Labs

As the list illustrates, there is significant variety in the types of network providers (e.g. mobile, wireline, MSO - Multiple System Operator, WiMax) who have developed or are planning application programs. Within the mobile space alone, the network providers with announced initiatives have a global reach of over 2 billion subscribers — half of the global mobile subscriber base.

Three areas in particular have attracted the greatest interest and investment for operators seeking to address these new opportunities:

1. *App Stores* – Many network providers (e.g., SK Telecom, Orange) have developed or are developing “app stores” similar to the Google Android Market, Nokia Ovi Store and Apple App Store. These app stores create a marketplace, often hosted by the network provider, where internal and external developers can distribute their applications to the network provider’s customers. In its simplest form, this is an extension of the network provider’s content portal. However, this channel is more focused on applications, with fewer restrictions around content types, and often with a vastly increased amount of third-party branded services. Managing a strong app store can also be a point of differentiation allowing the network provider to segment according to their customer segments and attract applications that are well suited for their user base.
2. *Developer communities* – Numerous network providers are building developer communities or dramatically augmenting previously launched initiatives. This involves raising awareness and recruiting developers to their new app platform and distribution channels. Network providers are devoting significant effort to educating developers about their new business and distribution models, in addition to technical aspects of their platforms. The focus of many of these new developer communities is often to support smaller developers who may be small professional shops or amateurs. The aim is to create direct relationships between network providers and a larger community of innovative developers. There is an expanding recognition that the global development community can bring depth and breadth to the applications offered by a network provider.
3. *Platforms* – Network providers are investing in the technical and operational platforms to support app integration into the network and back office. These platforms extend into network providers’ billing and operating systems. In addition to services interfaces, network providers are improving processes and support systems to allow for rapid and scalable onboarding of applications. Testing environments such as developer sandboxes and streamlined approval processes are key areas of focus.

Network providers vary significantly in their level of investment and focus in pursuing application enablement. SK Telecom, for example, is concentrating on creating a great application store environment, whereas O2’s Litmus has a stronger focus on the developer community. BT’s Ribbit initiative concentrates on a wholesale model that requires investment in the platform, but it does not have a retail application store for BT customers. Some network providers are developing all three areas, whereas some are just developing one (e.g. platform, as in the case of BT).

Although the majority of initiatives are focused on supporting external developers, the lessons learned from these initiatives can often be applied to in-house or white-labeled application development. In this way, efficiency improvement in the development and onboarding of third-party applications can lead to a reduction of internal commercialization costs and resource requirements.

It is also worth mentioning that many network providers’ developer programs are targeting different customer segments. The majority of application initiatives are focused on targeting the mass market consumer and small and medium businesses (SMBs); although network providers may choose to extend these capabilities into other areas of their businesses. There are a number of examples that address enterprise applications (e.g., Vodafone Applications Service, Telstra SaaS/T-Suite). Initiatives sometimes target specific segments and verticals within the enterprise or wholesale market, such as M2M (e.g., Jasper Wireless / AT&T). There are situations where network providers are even pursuing multiple initiatives in combination (e.g., Verizon Wireless, with its Open Development Initiative, VCast App Store, Android Market) to address the varied needs of their diverse target markets.

Based on current activity and thinking, the number of network providers launching application initiatives is expected to increase. Primary research shows that 40% of network providers are already engaged in this area, and another 30% of network providers have decided to pursue application initiatives in the next 12 months.

The next section details the significant challenges that network providers face as they increase the focus on innovative applications and open development models within their overall business strategy.

### 3. The challenges of rapidly delivering innovative applications

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Network providers face a number of key challenges in keeping pace with the competition and massively growing customer demand for innovative applications. Based on Alcatel-Lucent's work supporting network providers in this area, the most significant challenges are:

- difficulty in justifying the business case for added investment in application enablement
- legacy mindsets and other organizational issues, such as the lack of appropriate resources and structures
- adherence to legacy partnership models that limit the opportunity for innovation
- inefficient processes that cannot deliver applications in a rapid and cost-effective manner,
- issues with fragmentation from the developer perspective, including fragmentation across devices and device O/S, as well as fragmentation across network providers

Unless understood and addressed, these issues can restrict network providers' abilities to capitalize on the growing application opportunity.

#### 3.1 Challenge #1: Difficulties justifying the business case

Building and justifying a successful business case is the single largest obstacle that network providers face when they are looking at launching open application development programs. Indeed, there can be significant up-front and ongoing costs, which vary significantly based on the type of initiative being pursued. Understanding both the risk and reward are obviously critical for this, or any new, initiative. Factors that complicate risk/reward estimates in this case include: 1) the lack of well-established business models for network providers in this emerging and rapidly changing space, 2) the range and variety in business models being considered, and 3) difficulty estimating the market potential for any open model with undetermined applications and developer partners.

#### 3.2 Challenge #2: Organizational resistance

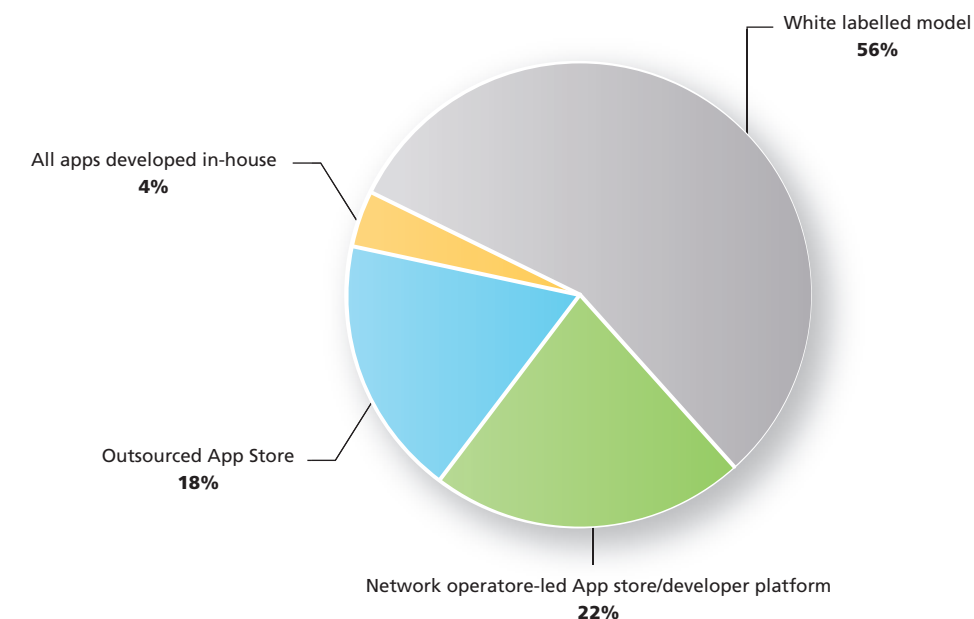
Many network providers have adopted a "walled garden" mentality that serves as a material barrier to more open application enablement. The threat of disintermediation has been an ever-present issue for network providers since the beginning of the internet. Mobile network providers have been all too aware of the fate suffered by many fixed line ISP's (internet service providers) in becoming a dumb pipe. Network providers have other well-placed concerns about working with external developers; risks of negative impacts on a network provider's network, systems, and brand are commonly cited. Although careful planning and policy development can help alleviate risks, the long held underlying concerns are often more difficult to overcome. Alcatel-Lucent research found that a third of network providers believe that a legacy mindset within the organization is a major obstacle to launching more open application initiatives.

Organizational barriers beyond mindsets can represent additional hurdles to new application enablement programs. Many network providers simply lack the appropriate organizational structures, processes and necessary staffing levels to support new initiatives. Cross-organizational issues can also arise if resources are shared across operating units. Many of the key components of a successful application enablement program (e.g., application store, developer program, development platform) can often be shared on a broader corporate basis.

### 3.3 Challenge #3: Legacy partnership models

In addition to building holistic business cases and overcoming organizational resistance, network providers may need to examine whether their existing partnership models are suitable for providing a large number of innovative applications. It is worth bearing in mind that the majority of network providers are currently relying on white-labeled or in-house development to bring applications to market. These network providers are working with relatively few developer partners at a time and are employing partnership structures that limit innovation in many areas. In addition, managing these partnerships under the existing model can be highly labor intensive. A shift to a broader set of partnerships and a renewed partnering model are required for future success.

Figure 3. Network provider application business models



Alcatel-Lucent primary research 2009

Under most white-labeled and in-house development partnerships, the developer plays a limited role in marketing communications, branding, and selling of applications. Developer autonomy over key aspects of application design may also be constrained. Accordingly, a developer has limited ability or incentive to innovate and add value, both for end users and for their distribution partners. Such constraints have been removed in the open development models being pursued by Apple, Google, and selected network providers such as BT with Ribbit.

### 3.4 Challenge #4: Inefficient processes

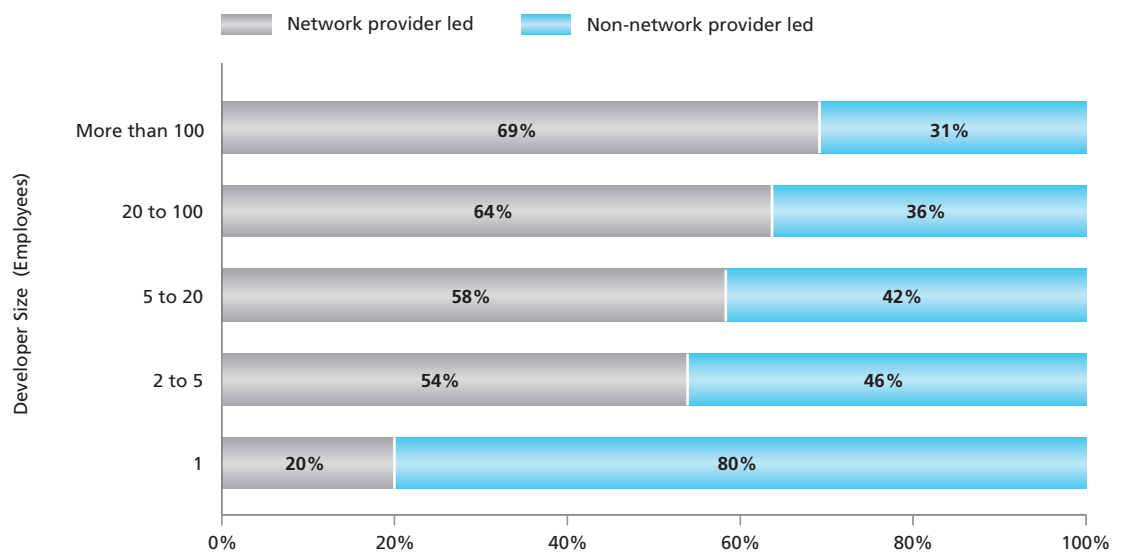
Few network providers have established processes to rapidly enable and deliver applications on a large-scale basis. Alcatel-Lucent's primary research reveals that the vast majority of network providers release fewer than 5 applications per month, and the average time that a provider takes to onboard applications is often 9 to 12 months. These performance metrics compare unfavorably with Apple, who onboards 5,400 applications per month. Having the ability to refresh application offerings and bring "current event"-based applications to market quickly are important factors for success.

The costs and length of time taken during onboarding and integration is often attributable to the predominance of ad-hoc, labor-intensive decision-making processes rather than automated or standardized policy-driven processes. As an example, the inefficiency of current processes can be seen in a network provider's enterprise business where increasing the number of connected devices to an enterprise application from ten thousand to twenty thousand might require a separate set of agreements and sign-offs to support each individual enterprise customer. Or, where tracking the acceptance of a new application might be managed by passing a physical piece of paper from desk to desk.

Often, existing processes are particularly unsuited for creating effective collaboration with outside partners. For example, commercial approval processes are often arduous and opaque, requiring developers to meet time-consuming requirements without visibility into the network provider's approval process. Many network providers require that developers meet face-to-face with their commercial team to discuss the full details of the business case. Developers often complain of delays in approvals and payment from network providers. Such delays and inefficiencies are particularly problematic for smaller developers, who cannot generally accept significant delays, risk, and cost during commercialization. Without a change to the status quo, many network providers risk missing the opportunity to harness the power of small, innovative developers.

Many developers are opting for alternative routes to market in commercializing their applications, choosing Apple's App Store, Andriod Market, and other non-network provider platforms. As shown in Figure 4, smaller developers historically have found network provider partnerships difficult to cultivate and onerous to work through.

**Figure 4. Proportion of developers using network provider channels, by developer size**

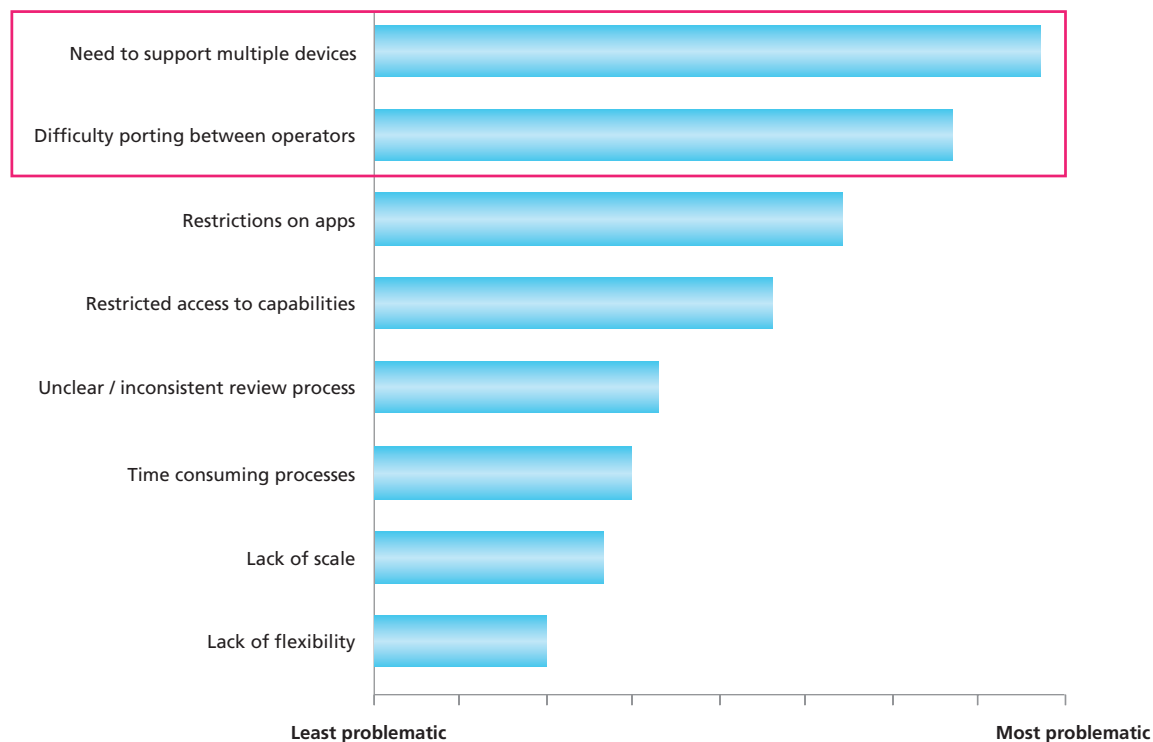


### 3.5 Challenge #5: Fragmentation

Primary research, asking developers to identify the limitations of working with network providers, identified fragmentation as the single greatest developer concern; this applies to fragmentation across devices/terminals and between network providers. Developers are commonly compelled to write multiple versions of a single application. Further, developers are forced to follow differing commercialization procedures in working across network providers. Such duplication increases development costs while significantly decreasing speed to market and, ultimately, the speed of innovation.



**Figure 5. Challenges for developers using network provider channels, ranked by level of impact**



Alcatel-Lucent primary research 2009

### 3.6 Implications

The combined effect of the challenges described above is that network providers may not be optimized for efficiently providing a broad array of applications to their customers. The risks associated with the status quo are manifold:

- Network providers face potential disintermediation in delivering apps to their end users. This is the path travelled by ISPs in fixed broadband, and a road that mobile network providers, MSOs, and enterprise-focused providers are keen to avoid.
- Network providers could expect a growing gap between their application portfolios and those of device and operating system (O/S) players (e.g., Apple, Google), and would then find themselves at a disadvantage in competing for customer loyalty with device and O/S vendors. Network providers would therefore lose leverage in future negotiations in areas such as device deals and revenue shares for search or advertising.
- Network providers could lose visibility and access to critical engines for innovation that exist outside of their organizations. Such a blind spot can have significant ramifications — network providers who fail to leverage outside parties may risk delays in bringing their customers the next “killer app” and lose competitiveness in the marketplace.
- From a financial perspective, network providers could forego significant opportunity to benefit from the sale and associated marketing of applications, as well as indirect revenue streams such as advertising and data plan sales. Both retail and wholesale models have the potential to generate positive margins while leveraging existing provider assets and core competencies.
- Network providers risk losing high-value customers attracted to large application catalogs offered by other providers and device O/S vendors working with other providers. Ignoring this fact would risk increased churn of their most valuable customers.

## 4. Recommendations for achieving success in applications

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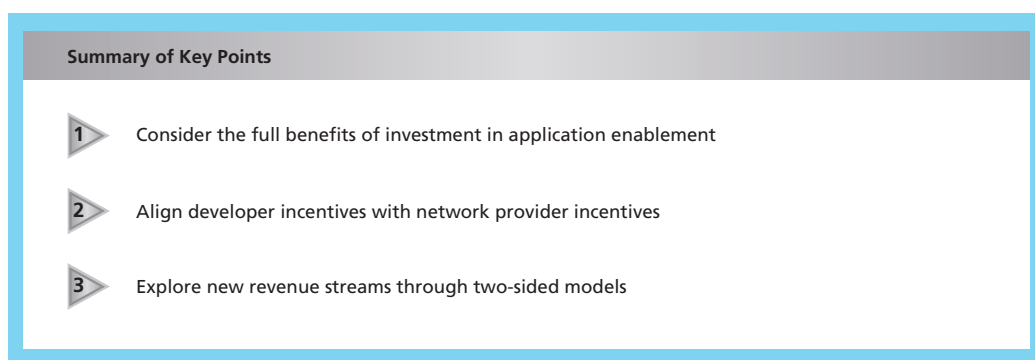
To overcome these challenges, a number of visionary network providers have developed novel strategies and tactical approaches for capitalizing on the application opportunity. In this section, we describe examples of these practices and offer a framework for network providers to plan their individual approaches. These strategies take into account developer needs identified by research. The best practices of Web 2.0 players, device vendors, and O/S providers have also been incorporated, where relevant. The four key recommendations detailed below therefore address the full set of challenges outlined in the prior chapter. These recommendations represent the best current thinking in the industry, supported by our own research and experience in working with network providers.

### 4.1 Recommendation #1: Build a holistic financial case

First and foremost in decision-making is the process of building the financial case for investment. The case relies on careful consideration of numerous factors, including factors that are often absent from simply constructed business cases accounting only for application store revenues. In addition to direct revenues from applications, indirect benefits of application delivery and cost-cutting measures must be included, as well as factors related to brand loyalty and the lifetime value of a customer. Partnership considerations are also critical, if the case is based on willing participation from outside developers. Finally, the case requires creation and maintenance of new two-sided business models. These key points are summarized in figure 6 below.

**Figure 6. Summary of recommendation #1 – “building a holistic financial case”**

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#### 4.1.1 Consider the full benefits of investment in application enablement

Network providers should look beyond direct revenue from application sales in evaluating the financial case for more open application enablement. Depending on the business model being pursued (with specifics to be discussed in more detail below), the indirect impacts on a network provider's subscriber base can be considerable. These indirect benefits include increased data plan uptake, gains in customer acquisition through marketing of applications, and increased customer loyalty through delivery of “sticky” applications and related value-added capabilities. For example, a wireless operator could differentiate its service offering by integrating key functionality (e.g., buddy lists or user-supplied preferences) with third-party applications delivered through the operator's application store. Network providers could add value over and beyond device and O/S vendor application store propositions by supporting applications across devices over a customer's lifetime.

Measures that reduce the cost of application development are also important drivers of a successful financial case. Alcatel-Lucent research suggests that few network providers are looking to new development initiatives as a means of reducing the cost of existing product development and partner management programs. Yet the potential for cost savings is real, based on both Web models and the early experience of innovative network providers. Many existing Web models are able to support a large range of low/no revenue-generating apps by use of automation, self-help, and community input. Similarly, O2 Litmus, a developer program in the UK, encourages end users to beta-test applications and give feedback to help improve the application. In the US, AT&T's devCentral emphasizes developer education through its developer portal in an effort to reduce bugs and minimize customer care issues with applications.

#### ***4.1.2 Align developer incentives with network provider incentives***

Though serving developers is not the end goal, success in this area is critical to a strong financial case for any provider pursuing open application enablement. Network providers need to understand the motivations of developers and align them with the network provider's own incentives. This is a challenging task since developers' needs vary widely — between large, established developers and smaller developers, between developers targeting the mass market and developers targeting a niche within the enterprise segment — making global generalizations extremely difficult.

Network providers therefore need to understand the unique needs of their developer targets (e.g., small development shops, amateur developers, enterprise-focused developers). Most importantly, network providers need to create partnership models that support the actual needs of prospective developer partners and align all parties' incentives. In targeting smaller developers, for example, network providers need to understand that non-financial incentives (e.g., developer contests) can be critical motivators. Such a characterization could not be made of larger developers, demonstrating the fact that segmentation and targeting of a network provider's developer program will be critical to success.

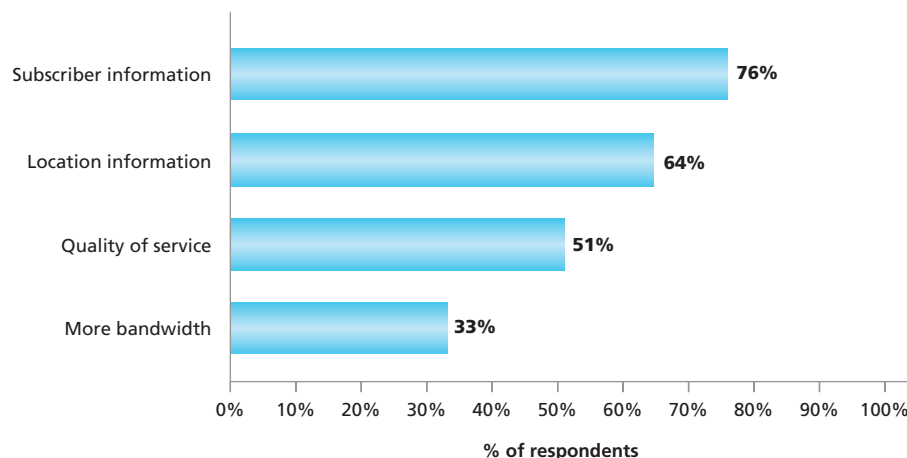
For many types of application and business models, revenue share arrangements can help network providers and their developer partners align incentives. We are seeing a marked trend in the industry toward revenue share arrangements, as evidenced by new high-profile initiatives (e.g. Vodafone 360, China Mobile's App Store and O2's Litmus). In our survey results, we found an overwhelming preference among developers for partnerships based on revenue sharing; developers prefer revenue share models because they minimize upfront risks and limit up-front costs. Network providers should therefore consider these partnership structures in developing or augmenting their developer programs.

#### ***4.1.3 Explore new revenue streams through two-sided models***

Two-sided business models have allowed web players to deliver low-priced or "free" applications to end users while relying on developers and advertisers for financial support. Similarly, two-sided business models can help network providers improve the marginal economics of application delivery. Providers should remain open-minded in exploring business cases with additional factors. As an example, a network provider could build a financial case for application enablement that includes selling premium app placements on their storefront.

Alcatel-Lucent research suggests that many network providers are missing important monetization opportunities. Most network providers did not believe that access to subscriber data (e.g., user-supplied preferences) was a major area of developer need or interest. However, survey results suggested that more than 75% of developers would be willing to pay for this information, on either a revenue share basis or per access/use. Developers also expressed great interest and willingness to pay for network provider supplied analytics (e.g., detailed reporting on the type of users who purchase an application).

**Figure 7. Developer willingness to pay for network provider exposed capability**



Alcatel-Lucent primary research 2009

## 4.2 Recommendation #2: Explore new business models

Alcatel-Lucent has identified and characterized five main business models that are increasingly being adopted by network providers as they address the application opportunity. These models focus on more effectively leveraging key network provider assets, streamlining commercialization processes, and promoting effective collaboration with outside parties. All models aim to position network providers for near and long-term financial benefit while bringing an expanded range of innovative applications to market. These models span varying levels of capability exposure and represent a range of revenue flows and partnering approaches (e.g., one-to-one partnerships, standardized partnerships). Accordingly, different models can be adopted to align with an individual network provider's unique market context, assets, and objectives. Some network providers may adopt more than one of these models to achieve different business goals within their individual business units. A brief summary of these models is provided below.

**Figure 8. Emerging third-party application enablement business models**



#### **4.2.1 Operator Led Model**

Large network providers who want to maintain a high degree of flexibility and control over applications enabled for their own end users are adopting the operator-led model. It is a retail model where network providers create and manage their own developer program, development platform, and app store. Examples include O2 Litmus, Vodafone 360 and SK Telecom's T-Store. Customer-facing roles are shared with developers, allowing independent developers to provide their own branding, marketing communications, pricing and care. In this model, the network provider plays a large role in the direction of the eco-system and is involved in development partner sourcing and management, as well as application selection. Network providers pursuing this model will often seek to partner with a large number of third parties using standardized onboarding processes.

The operator-led model is aimed at creating competitive advantage through differentiated app selection, app relevancy, and functionality, with the goal of building a strong market presence in this space. Indirect benefits of application enablement are crucial to the business case, including factors such as customer loyalty and data plan adoption. Network providers pursuing this model generally have modest expectations for direct revenue from application sales, which may be augmented by advertising revenue, among others.

#### **4.2.2 Aggregator Model**

Network providers who prefer to forego end-to-end responsibility for a developer program may choose to partner with one or multiple aggregators. In this model, players such as Nokia or Google may act as aggregators by bringing to the partnership their established developer communities (Ovi and Android Market respectively). Alternatively, network providers partner with established application aggregators (e.g., Cellmania) for their application catalog selection and storefront capabilities. In this model, the network provider may outsource one or all of the following functions to the aggregator: application selection, management of the developer community, management of the storefront and catalog, onboarding and testing. This model can be used by a network provider to fulfill its full application strategy or a portion of its application strategy — for example, to support feature phones while the operator employs an operator-led model for smartphones.

This outsourcing model allows network providers to focus on the monetization of the increasing popularity of apps, without necessarily needing to invest in their own developer programs or platforms.

#### **4.2.3 Mass Wholesale Model**

In addition to retail models where network providers maintain a direct relationship with their customers in the sale of apps, network providers are also engaging in wholesale models. These wholesale models exist for applications (BT's Ribbit — an IP based calling and messaging platform) and devices (Verizon's Open Device Initiative). The network providers' primary customers are the application developers or specialized device vendors. These developers pay the network provider for use of the network bandwidth and other network and back-office capabilities, which are typically accessed through APIs.

This business-to-business approach reduces a large portion of the potential costs of third-party application enablement (e.g. marketing, acquisition, support). Network providers who may find this approach attractive are those who recognize the limitations of their retail channel in addressing all segments economically, and who wish to effectively leverage unused capacity and other under-utilized assets.

#### **4.2.4 The Enterprise Customer Model**

Some network providers are focusing on enabling applications in the enterprise space. In this model, the network provider establishes a platform for their large enterprise customers. Some enterprise customers have developed specialized software, such as healthcare or financial software, that they want to mobilize or infuse with communication capabilities. Others may have a customized horizontal application, such as SAP, that they want to improve through a mobility feature or improved

communications capabilities. In this model, the network provider can provide standardized processes around mobilizing enterprise applications, as well exposing core communication capabilities and back-office capabilities to allow enterprise customers to dynamically self-provision capacity according to their needs.

#### **4.2.5 Trusted Partner Model**

Within the trusted partnership model, the network provider builds one-on-one relationships with trusted third-party developers, exposing capabilities in a customized manner. This model represents a shift away from the white label model and looks to bring in a greater, but limited, variety of brands to the network provider's portfolio. Network providers following this model often have only a handful of third-party partners, in contrast with the Operator-Led model. Examples of the trusted partner model include the 3/Skype partnership in the UK and the partnership between Virgin Media and BBC's video on demand service (iPlayer).

A major benefit of the trusted partnership model is that the developer is likely to bring with them a pre-established customer base and marketing resources. The business case should therefore be easier to justify, as the demand for the application has already been proven, and some costs can be shared. Exposing assets to third parties via trusted partnerships could also be seen as a potential stepping stone along the route to a more standardized platform for exposing capabilities on a larger scale.

### **4.3 Recommendation #3: Industrialize Processes**

Network providers need efficient, scalable processes and support systems (e.g., business process management, catalogues, automated testing, governance, monitoring) to support rapid, flexible, and cost-effective application enablement. By establishing industrialized processes and support systems, network providers will be able to support a large volume of applications and adapt quickly to changing demand patterns and niche customer segments. Improved efficiency will assist network providers in securing developer partners and also free scarce internal resources within the organization from burdensome one-off partnerships. The improved speed-to-market and cost-effectiveness is essential for supporting many of the emerging revenue models for application delivery, including ad-supported, freemium, and two-sided models.

Network providers should revisit the full range of internal processes involved in bringing applications to market. Areas such as partner-sourcing, application screening, technical integration, provisioning, data management and overall process flow typically have significant room for improvement within the vast majority of network providers. To achieve the goal of industrialized application enablement, investments in personnel, technology and process design are generally required.

### **4.4 Recommendation #4: Lessen fragmentation to achieve scale**

Network providers can impact the number of users that can be reached through a single instance of an application by increasing standardization across network providers. The industry as a whole is trying to address the fragmentation issue through standardization, led by industry groups (e.g. GSMA OneAPI) and cross-operator partnerships (e.g. Joint Innovations Lab). For those network providers who are working with third-party developers, solving the fragmentation issue is a key requirement to creating a viable channel for these third parties. Large network providers can begin by taking simple steps in allowing developers flexibility. For example, network providers can allow developers to choose which device to target with their application rather than requiring that all device types must be included. Or, they can decide to target specific types of applications for a subset of devices based on customer demand. Overcoming fragmentation in terms of devices, APIs and processes will play an important role in achieving the full growth potential of the application market.

It is essential to realize that the importance of factors such as scale or fragmentation varies by business model. Each of the five business models described above has a different set of dependencies and success factors, such as where to optimize and where to differentiate. Network providers need to select a business model based on their needs, and then identify the requirements for success, rather than taking a “one size fits all” approach.

## 5. Conclusion

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An increasing number of network providers are adopting new business models and embracing open development. Such activities represent new strategies to accelerate application enablement and address the growing demand for applications across consumers and enterprises. New partnership structures and business models allow network providers to achieve several common goals: 1) offering greater efficiencies in serving the demand for long tail applications, 2) allowing network providers to tap new sources of innovation spawned by broader development communities, 3) offering improved scale and speed in application delivery and, 4) establish new revenue opportunities both directly and indirectly associated with greater application adoption. By efficiently enabling applications and collaborating with third parties in a more open manner, network providers can establish their place as value-added participants in the emerging application ecosystem.

There is no “one-size fits all” approach for network providers to accomplish these objectives. Instead, network providers will need to consider, and possibly adopt, multiple business models to reap the full benefits of the application opportunity. These models vary across customer segments, device/terminals, and networks based on the specific demands of the end market and interested developers. In addition, a network provider’s own internal strategic and organizational position will impact model selection.

The market is evolving at a fast pace with monthly announcements by major players across the industry. Network providers face many challenges in both decision-making and execution. The industry innovators and early followers have already begun to take action, as they perceive opportunity in the midst of turmoil. All network providers need to develop concrete plans in this area based on their current competitive context and desired future positioning.

## 6. Authors

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Cindy’s career started with Bell Labs, and her experience includes a variety of software product development, deployment, strategy, and offer management roles, as well as diverse international programs, such as the creation of software R&D centers in India and Indonesia.

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