Using Cloud Services for Building Next Generation Mobile Apps
Enterprises are in the midst of a major transformation as it relates to their interaction with customers, partners and employees via mobile apps. Next generation mobile apps currently being rolled out offer a richer, more immersive experience by leveraging social capabilities and accessing public cloud-based services as well as enterprise data and custom applications.

To enable many of these capabilities, server-side development is a natural requirement that entails developing custom software and architectures made up of web, application and database servers. Interestingly, mobility is driving a shift away from server-focused application development to client-focused development with an almost maniacal focus on the user experience and UI form factor. Due to the high costs, complexity and time investment that custom server-side development efforts require, many organizations are now turning to cloud-based services as a viable alternative. Commonly known as Mobile Backend as a Service (MBaaS), such backend services can be consumed by simple APIs over the cloud to deliver secure, scalable capabilities to the application, thus allowing continued focus and investment on the client-side experience.

This white paper explores the role such cloud services play in the delivery of these new mobile applications. Several ‘do-it-yourself’ implementation options are described along with the challenges associated with them. Finally, a new solution is presented that offers a fast, cost effective and low risk option to the delivery of such mobile cloud services.
Introduction to Mobile Cloud Services

The mobile application market is rapidly evolving. Just five years ago it didn’t even exist. Today it is the de-facto way to interact with your customers, partners and employees. A mobile strategy serves to increase customer loyalty and employee productivity, while lowering costs and improving time to market. A mobile strategy is now viewed as a must-have strategic initiative and a major competitive differentiator.

With the explosive demand and the flexibility of choices, the landscape has become highly fragmented - resulting in a complex mix of devices (smartphones and tablets), OS platforms (iOS, Android, Windows Phone 8, and BlackBerry), and technologies (native apps, HTML5).

First generation mobile applications offer relatively simple front-end clients that essentially mobile-enable existing web applications and enterprise data. These applications however provide limited practical utility.

Leveraging the transformative technologies of the connected cloud and the power of social media however are the drive behind the next generation of mobile applications that offer a richer, more immersive user experience. Connected, social applications are more compelling and enable you to communicate directly with your customers and employees much more quickly and effectively than before. Such applications take advantage of the mobile device itself (e.g., taking photos and uploading them), the context that device provides to the application (e.g., your location), as well as additional cloud services from third party applications (e.g., PayPal billing) and enterprise backends (e.g., SAP, Oracle).

As a result, enterprises are significantly increasing their investment in mobile application development as they start to roll out tens or even hundreds of such network-connected applications. In order to do this quickly, cost effectively and in a scalable manner, these organizations are evaluating various delivery options for the backend services, known as mobile cloud services or in some cases Mobile Backend as a Service (MBaaS).
Mobile Backend as a Service (MBaaS) Requirements

MBaaS is an approach used by organizations to deliver next generation services to mobile devices and applications in a scalable and cost effective manner. When implemented correctly, this can help accelerate the creation of applications by providing building block services that can be readily consumed by them. Examples include channels to connect with social media such as Facebook and Twitter, payment & billing services, such as PayPal, access to corporate enterprise systems such as SAP and Oracle, push notifications, and check-ins.

The key requirements that make up this mobile cloud approach are:

1. Elastic scalability and high availability to manage unpredictable demand
   Due to the sheer volume of mobile devices, the successful adoption of a mobile application can grow virally in a matter of hours. Predicting this demand and determining the requisite amount of infrastructure and capacity however is impossible. Over-engineering the infrastructure results in wasted cost; under-engineering results in performance problems and customer dissatisfaction.

   Elastic scalability ensures that the right amount of infrastructure resources are allocated, on-demand, based on current usage levels. When demand increases, so too does the infrastructure capacity. Conversely, if demand decreases, so does the infrastructure capacity.

   With users in all geographies continuously accessing the applications and their services, the mobile cloud must maintain a constantly high level of availability. Users no longer tolerate slow or unavailable services and will not hesitate to find alternative applications. The costs of achieving the highest levels of availability increase dramatically and can become prohibitive.

2. Security and reliability for continuous access
   Ensuring the integrity and privacy of the data in any cloud infrastructure as well as maintaining secure access to it, is of paramount importance. Security is rarely binary, and is most commonly viewed as layered tiers that result in different risk levels, driven mostly by cost and control.
Comprehensive security requirements typically cover the following domains:

- The physical security of the data center(s)
- The up-to-date patching of the underlying virtualized infrastructure
- The segregation of customer data across shared computing resources
- The handling of data at rest as well as in transit

3. Reusability of services across applications
With potentially hundreds of mobile apps being developed over time, organizations must be diligent in ensuring that the set of backend services are not tightly coupled to each individual app. Instead, a shared services model should be used to ensure that those common services can be reused efficiently by the apps in order to minimize duplicate development efforts and accelerate the delivery time.

Over time, this has the potential to make the application development process significantly simpler and faster by reusing the component services, rather than embarking on a brand new development effort. With hundreds of new applications being rolled out, significant savings can be realized by leveraging such commonly shared services.

4. Orchestration of multiple data sources, public and private
Creating a mobile app with high utility and value requires access to data from many sources, including public cloud services such as PayPal and Facebook, internal front- and back-office systems such as SAP and Oracle, as well as other custom enterprise applications.

A mobile cloud service must be able to not only access these data sources, but also to aggregate, orchestrate and mobile-enable them for use by the client apps. This middleware-like capability offers a more elegant solution when used in the backend than on the client, which poses both performance challenges as well as reusability issues.
Traditional Implementation Options with Internal Server-side Development

Although there are several ways organizations can deliver their own mobile cloud services, the following represents the most popular options:

1. **Internal server-side development, deployment at the data center using internal infrastructure**
   This option represents the traditional modus operandi. Hardware, software, and networking infrastructure is first procured or allocated, and then provisioned in the data center (and in many cases as virtualized infrastructure). The relevant services are then coded on the backend using server-side development and scripting languages such as PHP, Ruby, Java, JavaScript and Python. Then the services are exposed via APIs, tested, and then managed continuously once deployed. Client-side development can then be completed by integrating to the backend services as well as any other public cloud systems (such as social media sites, commerce platforms, etc.).

2. **Internal server-side development, deployment using Infrastructure-as-a-Service (IaaS)**
   This option is similar to the first, although in this case, rather than delivering the backend services on internally managed networking infrastructure, a third party IaaS provider such as Amazon, Rackspace or Terremark is used in the cloud. Although this option typically costs less, the customer is still responsible for the development and management of the backend software and APIs that provide the mobile cloud services.

*Figure 1: Building and managing your own mobile cloud services is a complex endeavor*
Regardless of the above-mentioned approaches to server-side development, there are two fundamental challenges with them around cost and time:

1. Development and Infrastructure Costs
   In both cases, significant server-side development resources are needed to build the required services, and these represent the most dominant costs of the overall initiative. Typically this represents 40-50% of the overall development costs.

   Regardless of whether internal or external resources are commissioned, typical server-side development can cost hundreds of thousands of dollars for each application, and is comprised of the full lifecycle of activities including:

   - Identifying the services to be developed
   - Coding the services in multiple languages to support different mobile platforms
   - Developing and publishing the service APIs
   - Testing and fixing the services and APIs
   - Deploying the services to the back-end system
   - Monitoring the services and underlying resources, and scaling with demand
   - Maintaining and evolving the services and APIs over time

   Additionally, server hardware, networking infrastructure, bandwidth and system software is also either procured or leased.

   Finally, software support licenses are also typically acquired - even when using popular freely available and open source products like Linux, Apache web servers and MySQL databases.

2. Time to Market
   Time to market remains one of the most compelling business imperatives and is often the difference between long-term success and failure. Given the above-mentioned activities, typical new mobile applications take anywhere from two to six months to complete, with 50% of the time being spent equally between client-side and server-side development. With business and competitive pressures this time lag is often times unacceptable. Further, as these mobile applications continue to leverage and integrate with backend enterprise systems, this will only increase over time.

   Time: About 50% spent on backend development, 2-6 months per app
   Cost: $100k-1M per app
   Resource: Lack of server-side skills; existing infrastructure insufficient

   Figure 2: Backend development is costly and time consuming and increases time to market
MBaaS: A New Approach for Mobile Cloud Services

Given the above-mentioned challenges, an alternative approach is needed.

What if you could build out your next generation mobile cloud at a fraction of the time and cost, using the development resources you already have, with lower risk, that can reliably scale with your user adoption?

Appcelerator Cloud Services (ACS) is a cloud-based service that offers a fast and easy way to build connected mobile applications. Just like SaaS offerings provide ready-to-use applications over the cloud without installing any software, ACS offers ready-to-use services that can be consumed by the mobile apps in a similar manner. ACS also shields you from managing server hardware and storage or dealing with virtualization and networking.

In addition to addressing the key challenges above, ACS also provides numerous other benefits.

Its key capabilities include:

1. **Library of pre-built, commonly used services**
   These proven, robust services provide commonly used mobile application services which reduce both integration time and risk, while enabling you to build your next generation apps.

   Popular services include:
   - User Management – which allows the application to create usernames and passwords, authenticate users on login and manage sessions
   - Push Notifications – which enables the delivery of popups and messages to different users
   - Check-Ins and Status Updates – which allows users to associate a time and place with information such as a photo or comment

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*Figure 3: Appcelerator Cloud Services offers a fast, easy way to build connected mobile apps*
- Photos – which enables the uploading of photos and the automatically resized delivery to devices

- Custom Objects – which facilitates the creation and management of your own custom objects (e.g. product, SKU, car, etc.) along with attributes which can be stored and queried

- Social integration – which helps you connect your users with popular social networks such as Facebook, Twitter, and LinkedIn

- Access Control – which provides fine-grained control over which app users can read and write data stored in the cloud

2. Client-side APIs for any development platform
All API services are exposed (and fully documented) via a REST API and SDKs for iOS, Android, and JavaScript, making the invocation quick and easy from the client-side, regardless of the underlying mobile platforms. This allows organizations to take advantage of the more pervasive skill sets of web and native application developers rather than the less common and more expensive server-side developers.

Although you can use ACS with any mobile development platform, you can realize significant benefits by using Titanium Studio, including:

- Richer application functionality due to the 5,000 APIs and Marketplace modules

- Increased productivity due to a single environment for both client development and backend services

- Reduced cost of development by leveraging common JavaScript skills

- Reduced training and support costs

Library of Pre-Built Common Services

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Figure 4: The pre-built library of common services reduce development time and risk
3. Extensibility, to build your own custom services for all your mobile apps

There will likely be instances where you need your own custom services, for example to access your internal corporate enterprise systems and data sources. ACS provides you with the ability to easily create these services. Once created, they act like any of the pre-built services and are consumed in exactly the same way as detailed above.

Tailored extensions can be built that are industry specific (e.g., telco, finance, insurance, government, travel) or technology specific (e.g. security, ERP/CRM).

Since these capabilities are enabled via Node.js, development of the services is done using JavaScript, one of the world’s most popular programming languages. Using Titanium Studio therefore provides users with a unified mobile development environment for both the client side apps as well as the backend cloud services, which offers significant benefits regarding productivity, skillset re-use and training time.

4. Elastic scale to support user adoption

ACS automatically distributes the load from the mobile application traffic to ensure a highly elastic environment. As your user adoption grows the back-end will transparently ensure the right amount of resource are allocated.

5. Flexible delivery models

ACS can be consumed in a variety of ways depending on your organization’s desired level of security and control.

- ACS Public Cloud: The back-end is hosted and managed by Appcelerator in the cloud
- ACS Virtual Private Cloud: The back-end is hosted and managed by Appcelerator in the cloud, but with dedicated infrastructure and VPN access for increased security and control
- ACS Private Cloud: The back-end is hosted and managed on your premises or data center, for maximum control and access to local data sources

ACS intelligently distributes API calls among the servers and scales based on demand.

Figure 5: Appcelerator Cloud Services scales elastically with your user adoption
Conclusion

Delivering next generation mobile apps promises a more immersive experience with your customers, partners and employees, which in turn helps increase productivity and market competitiveness. MBaaS is the key enabler of these apps by providing scalable backend services that also integrate social channels as well as data from your corporate enterprise systems.

By adopting MBaaS as a key component of your mobile strategy, significant cost savings can be realized from lower capital costs, development costs and operating costs. Further, business agility is increased as you accelerate your time to market and leverage the reusability of existing services.

Join the many customers who have adopted a mobile cloud solution using Appcelerator Cloud Services to deliver their next generation apps faster, and at significantly lower cost and risk. If you are interested in realizing the same benefits for your mobile strategy, please contact us.

Find out more: www.appcelerator.com/cloud

Appcelerator is the #1 Mobile Cloud Platform

Appcelerator is the leading enterprise-grade, cross-device mobile development solution on the market today, with over 350,000 mobile developers worldwide and 40,000+ cloud-connected applications used on 50 million devices every day.

The company’s flagship offering, Appcelerator Titanium, is the only platform to enable fully native, cross-device development from a single codebase for iOS, Android, Blackberry, and HTML5 mobile web apps. Appcelerator’s Cloud Services enable easy integration of compelling features such as push notifications, user logins, and photo uploads.

Appcelerator’s customers include NBC, Zipcar, eBay, PayPal, and LEGOLAND. These companies develop their mobile applications on Appcelerator products so they can decrease time-to-market and development costs, increase customer adoption and revenues, and enjoy greater flexibility and control. Download Titanium for free at www.appcelerator.com.