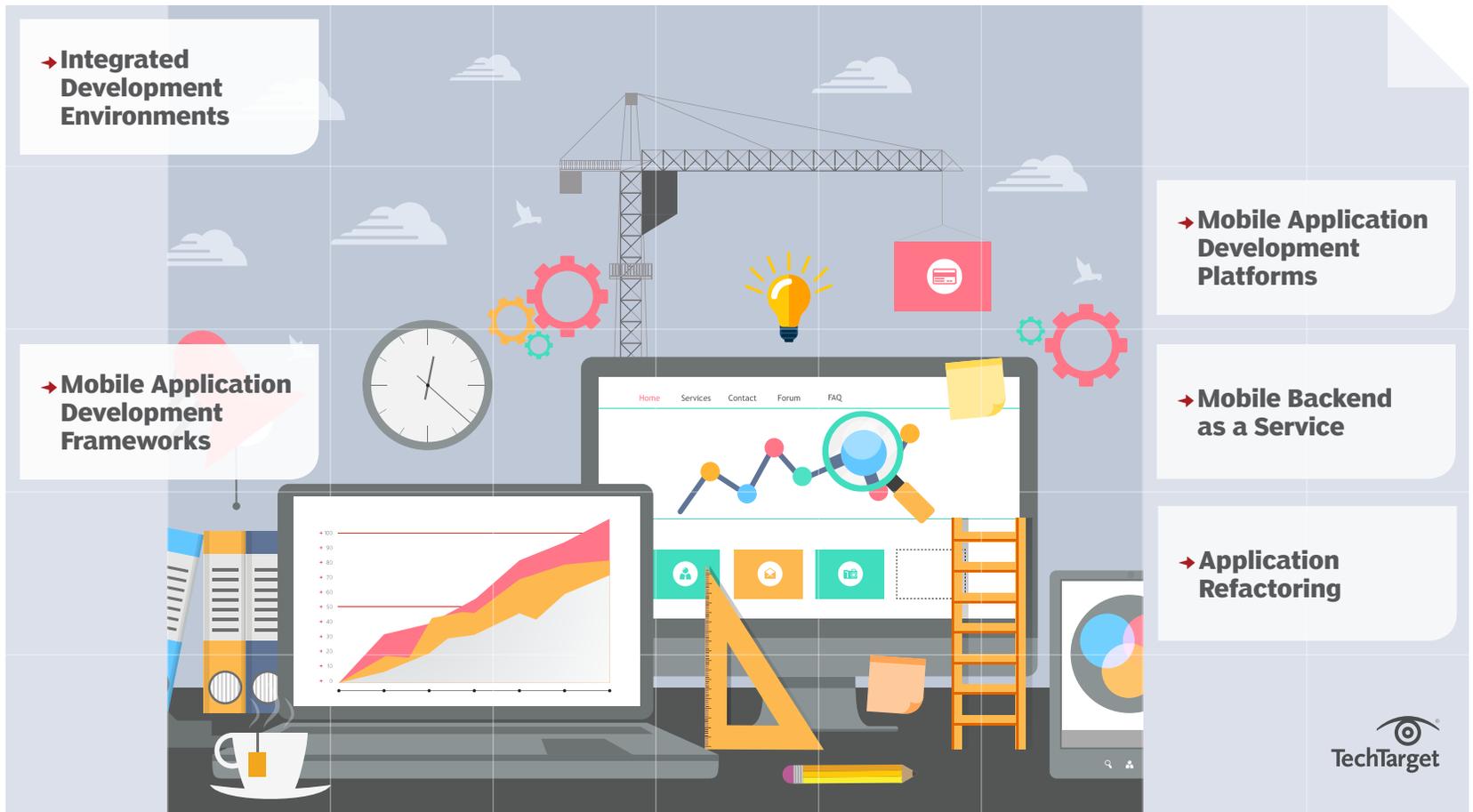


TOOLS TO SIMPLIFY MOBILE APPLICATION DEVELOPMENT

With a slew of tools to build, streamline, transform and refactor applications on the market, companies should have no trouble finding ways to ease developers' struggles.

BY ROBERT SHELDON





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I T CAN BE a lot of work to develop mobile applications, especially because companies must support multiple operating systems and device types. Nothing can help ease the load more than having the right development tools. Yet these tools come in an assortment of shapes and sizes, so it isn't easy to choose the right ones.

There are many development tools at IT's disposal, from integrated development environments (IDEs) to products and services for refactoring applications. There are also mobile application development frameworks (MADFs) for building cross-platform apps, mobile application development platforms (MADPs) for developing and deploying apps, and providers that offer mobile backend as a service (MBaaS) to support and enhance applications.

Regardless of the type of available tools, they all have one goal in mind: to simplify the process of developing mobile

apps. Yet choosing which tools are right for an organization and the developers that use them can be a daunting task.

Before the search begins, IT decision makers should know what device types and operating systems the applications will target. Will they run on both Google Android and Apple iOS phones? What about tablets? Or even smart-watches? And don't forget Windows and BlackBerry devices.

Companies should also determine the types of apps they want to deliver. Native apps provide the best user experience, but generally take more time and resources to develop. Web-based apps are faster and easier to implement, and they can run on just about any platform. But they usually don't perform as well as native apps or offer the rich assortment of features. Then there's the hybrid approach, which takes advantage of both web and native capabilities to deliver something in between the two.

Once businesses determine the types of apps they plan to develop, they can choose the tools they need to build them.



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INTEGRATED DEVELOPMENT ENVIRONMENTS

Most developers' primary tools are IDEs, which are applications that provide a programming environment for writing, editing and debugging code. Although an IDE is often specific to a development environment such as .NET or Java, it usually integrates with other systems to better manage the application lifecycle. For example, IDEs can often interface with source control or continuous integration systems. For native mobile apps, developers should choose the IDE for the operating system they want to develop applications for: Google's Android Studio for Android apps, Apple's Xcode for iOS apps and Microsoft's Visual Studio for Windows apps.

Android Studio is a relative newcomer to the IDE scene. Before Google released Android Studio, the recommended tool for Android development was the Eclipse IDE, and developers used it in conjunction with the Android Development Tools plug-in. Now Android Studio is the de facto development tool for building apps that can run on Android devices. Most mobile devices around the world run the Android operating system, and Android Studio is free to download and use, so it's no surprise that the IDE has made quick inroads into the development community.

Developers who want to build apps for Apple's mobile operating system must use the Xcode IDE. It's also free to use, although developers must pay to distribute those applications to Apple's App Store. With Xcode, developers can also build apps for Mac OS X, Apple Watch's watchOS and

Apple TV's tvOS using the Swift programming language.

Many developers immersed in the .NET Framework use Visual Studio as their go-to tool for Windows applications, including those for Windows mobile devices. Visual Studio provides a feature-rich development environment for working with C#, Visual Basic, Objective-C, JavaScript, PHP and other languages, and it has the support of a strong and active user community.

Developers face a number of challenges when building mobile apps for multiple OSes. Creating an app for iOS is much different than creating an app for Android.

Microsoft has been working to make Visual Studio a friendlier environment for developing apps that can run on Android and iOS devices. Since the company acquired Xamarin in early 2016, Microsoft has incorporated the Xamarin framework into all Visual Studio editions, which has made it possible for C# developers to build cross-platform apps that can run on non-Windows mobile devices.

Despite Visual Studio's expanding roles, developers focused on native iOS or Android development may want to use the tool best suited for the specific device architecture. Still other developers prefer the open-source nature and



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flexibility of using Eclipse along with the available plug-ins to build iOS, Android or BlackBerry apps.

MOBILE APPLICATION DEVELOPMENT FRAMEWORKS

Developers face a number of challenges when building mobile apps for multiple operating systems. Creating an app for iOS is much different from creating an app for Android, BlackBerry or Windows Phone. Developing for multiple OSes can mean learning new tools and programming languages.

For this reason, many organizations turn to MADFs to help mitigate some of these challenges. MADFs allow developers to use familiar tools and languages to build cross-platform apps that can run on multiple mobile operating systems.

MADF generally fall into one of two categories: native or hybrid. The native types convert one programming language into the native languages of the target mobile platforms. The hybrid types use client-side technologies such as HTML, CSS and JavaScript to deliver an application that runs within a shell on the target OS. The native approach usually delivers better performance and user experience, but requires more developer skills. These apps can also be more difficult to maintain over the long haul. Even so, developers with the right skills will find that the native type

MADF can help simplify many of their projects.

One MADF that takes the native approach is Xamarin. The product supports a .NET development environment, which allows C# developers to use their existing skills to deliver Android, iOS and Windows mobile apps. Another popular framework for creating mobile apps in their native

Hybrid apps are not on par with native apps, but this approach is simpler and faster because developers can use their existing client-side scripting knowledge.

code is Appcelerator Titanium, an open-source SDK based on JavaScript. Titanium provides more than 5,000 APIs for building iOS, Android, Windows and BlackBerry mobile apps. An alternative to Titanium is Corona, another open-source SDK. With Corona, developers can build apps for Android, iOS, Windows Phone, Kindle, and Mac and Windows desktops.

Developers who plan to take the hybrid approach to cross-platform development have a wide range of options to choose from. Although the performance and user experience of hybrid apps are not on par with native apps, this development approach tends to be simpler and faster because it allows developers to use their existing client-side



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scripting knowledge.

One of the most well-known and frequently used hybrid frameworks is Adobe PhoneGap, an open-source tool based on Apache Cordova. Developers can use HTML, CSS and JavaScript to create a single code base to build apps for iOS, Android, BlackBerry, Windows Phone and other operating systems. A wide range of plug-ins that provide a JavaScript interface to native components are available.

Developers that need a more complete package might want an MADP. It provides the tools developers need to build, test, deploy and manage mobile apps, as well as APIs for integrating with other systems.

There are also plenty of other frameworks out there for creating hybrid applications, including jQuery Mobile, Sencha Touch, Ionic, Kendo UI and many more. Each offers its own spin on app development and they can vary in capabilities and complexity, but they all provide the ability to build hybrid mobile apps that can use at least some of the target OS's native capabilities.

When shopping around for MADPs, whether those focused for native or hybrid apps, you should take into account not only your application requirements, but also the

skills and resources available to your organization and what each tool will require.

Some frameworks support both native and hybrid cross-platform apps. Some even support web-based apps. Some frameworks are open source, others are not. Some come with larger user communities than others. Some support more development languages. As with any tool selection, you should know upfront what it is you need and are trying to do, before making any decisions.

MOBILE APPLICATION DEVELOPMENT PLATFORMS

Developers that need a more complete package than what's available with a framework might want an MADP. A comprehensive MADP provides the tools developers need to build, test, deploy and manage mobile apps. Such platforms also include APIs for integrating with other systems as well as mechanisms for customizing the apps beyond the out-of-the-box capabilities. Some platforms even provide back-end systems and services.

When assessing MADPs, one consideration to keep in mind is how well the platform supports codeless or near-codeless development, also called rapid mobile application development. Under this model, people without much technical development expertise can use point-and-click operations to quickly and easily build mobile apps they can deploy across multiple operating systems. Some of these

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platforms also allow customizations (which require coding skills), but the primary development model is geared toward power users, rather than developers.

One example of this kind of MADP is Force.com from Salesforce. Users simply create custom objects that define the application and control how data is presented. Force.com is cloud-based, so when users deploy their applications, they're immediately available through any web browser or through the Android and iOS mobile apps. This approach is similar to the shell technique used to build and run hybrid apps. Force.com is heavy on the point-and-click approach to development, but professional developers can use it to create custom components to meet an app's unique requirements. In addition, Force.com provides the infrastructure necessary to deploy and maintain the apps throughout their lifecycles.

Amazon Web Services Mobile Hub is another cloud-based platform for building and deploying mobile apps. It includes services for building and testing Android and iOS apps, as well as features such as authentication, data storage, push notifications, back-end notifications, content delivery and analytics.

Not all MADPs are cloud-based, however; many are available on-premises. For example, IBM's MobileFirst Platform Foundation provides an environment for building and managing enterprise mobile applications. Developers can use the platform to test, deploy, monitor and analyze apps

for a wide range of operating systems, including Android, BlackBerry, iOS and Windows. The platform supports the complete app lifecycle, from development to implementation to ongoing maintenance. And SAP's Mobile Platform

The back-end systems that support mobile apps are just as important, but building them can be complex and resource-intensive. For this reason, many organizations turn to MBaaS to give mobile apps access to resources such as storage, databases or servers.

offers infrastructure for developing, deploying and managing mobile business apps. The platform provides the tools necessary to build native, hybrid and web-based apps for iOS, Android, Windows and BlackBerry devices.

There are plenty of other MADPs as well, such as Kony Studio, Appcelerator Platform and Telerik Platform. First decide whether to go with a cloud-based service or on-premises tool. Some on-premises products—such as MobileFirst—can also be implemented on a cloud-based hosting-service. It's important to fully understand what features each platform offers and which ones are important to developers and the company, so buyers should do their homework before committing to any one platform.



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MOBILE BACKEND AS A SERVICE

The back-end systems that support mobile apps are just as important as the app's usability and performance. The back-end infrastructure keeps apps running, makes data available and ensures that it is properly safeguarded. Building back-end systems to support mobile applications can be a complex and resource-intensive undertaking, however. For this reason, many organizations turn to MBaaS, which uses cloud computing to give mobile apps access to resources such as storage, databases or servers. This can save months of development and lets developers focus on the application front-end which helps ensure a better user experience, and deliver applications faster.

Such services rely on APIs and SDKs to connect the apps to the back-end services they need, which can help simplify and unify development efforts across multiple platforms. In addition, developers don't have to repeat boilerplate code for each app or set up redundant application stacks. Subscribers also get a core set of service such as geo-location, push notifications and user authentication.

One popular MBaaS product is Parse, a free service known for being easy to work with. Not only does the service offer API references for iOS and Android, but also for languages and systems such as OS X, JavaScript, PHP, Unity and .NET with Xamarin. Unfortunately, the Parse service will shut down on January 28, 2017, so any organization that has invested in Parse integration will have to go back

Organizations can also look to application refactoring, which uses virtualization, remote desktop protocols, web technologies and other techniques to deliver legacy apps in a mobile format that is more suitable for small, touch-screen devices.

to the drawing board to keep their apps up and running. Other MBaaS services include Kinvey, Kumulos, Appcelerator Cloud, StackMob, Applicasa and many more that offer a wide range of back-end services to organizations large and small.

APPLICATION REFACTORING

Organizations can also look to application refactoring to deliver mobile apps. Refactoring uses virtualization, remote desktop protocols, web technologies and other techniques to deliver legacy apps in a mobile format that is more suitable for small, touchscreen devices.

Refactoring requires no access to the source code, nor does it take development expertise. It just requires a bit of discretionary pointing and clicking. Although refactored apps can't compare to native apps when it comes to the user experience, they can be credible alternatives in situations



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where companies cannot justify the costs and resources required to deliver more traditional mobile apps.

Refactoring can be useful for just about any legacy application that might require a mobile spin. It can also come in handy for newer applications that do not deliver the mobile features workers need.

The right IDE or MADF can be instrumental in improving efficiency, and the right MADP, MBaaS or refactoring tool can help developers and administrators focus their attention on projects that take priority.

One possible refactoring use case is as an interim solution, such as when a company plans to implement new tools and systems at some point in the future, but must provide mobility for legacy systems temporarily. Or consider refactoring for business apps that support a few users who perform non-critical operations.

Refactoring tools are available as on-premises products or cloud-based services. Two of the most notable on-premises products are from PowWow and Reddo Mobility. PowWow uses a Remote Desktop Protocol session to capture the application, stream and dissect its components. It uses HTML5 to deliver the application to any iOS, Android or

HTML5-compatible device. It also provides the mechanisms necessary to fine-tune the application.

Reddo takes a different approach. It inserts itself between the Windows operating system and presentation layers to capture the screen rendering instructions that the application sends to Windows. It uses this information to repackage the application and deliver it to any Android, iOS or Windows mobile device via HTML5. It also provides fine-tuning capabilities.

Cloud-based refactoring services include Capriza and StarMobile. Capriza was one of the first vendors to get into the refactoring game, however the service has a narrower focus than other products. It only works with web-based applications. Capriza uses a virtual browser to capture and transform the original web application and deliver it to the Capriza cloud, where it is rendered and delivered via HTML5 to iOS and Android devices.

StarMobile can transform Windows, cloud, custom-built or web-based apps. The service uses its own protocol to abstract the application interface and make it fit for mobile use, without making changes to the underlying program. According to StarMobile, the refactored applications can be delivered to all leading mobile device operating systems.

There's no consensus on whether one of these methods is the right way to go about refactoring applications. Organizations must determine whether refactoring is the right fit. It's not the answer for all mobile applications, but it works



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for some. Refactoring can be a good option for getting less important apps off developers' plates so they can focus on more critical projects.

There's no shortage of tools available for simplifying application development. The right IDE or MADF can be instrumental in improving efficiency and reducing efforts. The right MADP, MBaaS or refactoring product can help free up developers and administrators so they can focus their attention on projects that take priority. ■

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