Executive Summary
As mobile devices become ubiquitous in the workplace, mobile applications are increasingly integral to everyday business operations and workflow. Having the right app — accessible in the right way — is critical. Effective mobile application deployment requires a thorough understanding of business needs and research into available solutions. A coherent app strategy is key to making the most of these business tools.

The market for mobile applications and device-centric computing has exploded over the past five years, dramatically affecting organizations of all types. Increasingly, employees expect to use enterprise or personal smartphones and tablets for business activities. And they have come to rely on mobile apps to make the most of their devices and their time.

The increase in smartphone and tablet use has forced changes in the way enterprises deliver information, services and business logic to client devices, be they for staff, business partners or customers. When properly designed and rolled out, mobile apps help enterprises boost user productivity, streamline business activity and ultimately reduce expenses.

Organizations can decide among numerous off-the-shelf or customized solutions based on their needs. However, before taking action, enterprises should develop a strategic worldview of their mobile app initiatives, mapping deployment and development decisions against needs, budgetary constraints and IT infrastructure. This strategy serves as a critical roadmap for enterprises to migrate to a more mobile environment.
The Mobile Imperative

The ubiquity of mobile device ownership among enterprise users is indicative of the devices’ inevitable prevalence in the workplace. In 2013, the number of smartphones and devices connecting to the Internet worldwide surpassed the number of personal computers. Many of these connections happen in relation to work. A 2014 Dimensional Research survey found that 95 percent of surveyed organizations reported mobile devices connecting to their networks.

The trend toward mobile devices has fueled a transition to bring-your-own-device (BYOD) policies, in which an IT department supports personal mobile devices for work use. The Dimensional Research survey found that nearly three-quarters of organizations now support BYOD, with the number of BYOD devices connecting to enterprise networks more than doubling in the past two years.

BRING YOUR OWN APP: THE NEW BYOD

IT departments have struggled with the bring-your-own-device movement since the days of the first personal computers. Affordable smartphones and tablets have taken BYOD to the next level. BYOD is big business, and getting bigger. Research firm MarketsandMarkets expects BYOD spending to reach more than $266 billion in 2019, up from nearly $72 billion in 2013. Meanwhile, a 2013 Spiceworks survey of about 1,000 IT professionals finds that 61 percent of small and midsize businesses support a BYOD policy.

The growth of BYOD has also created a new challenge for IT organizations, in the form of BYOA, or bring your own app. The simplicity of partially custom app stores has prompted individuals and even entire business units to deploy off-the-shelf mobile apps without formal planning or management input from the IT group. The risks of such unmanaged app proliferation are many, including:

- **App fragmentation** created when different people and units deploy competing or incompatible apps for similar tasks
- **Security risks** that result from unvetted and unmanaged apps residing on mobile devices that connect to enterprise networks
- **Support problems** that arise from a lack of formal vendor contracts, employee training programs and IT engagement
- **Inflated cost of ownership** resulting from issues related to fragmentation, security and support

IT organizations can rein in BYOA proliferation through a combination of well-articulated policy and enterprise mobility management suites. EMM packages from vendors such as AirWatch and MobileIron can be used to create managed, enterprise app stores populated with approved mobile apps. These suites can also be used to detect or prohibit rogue app installations on mobile devices and guide workers to approved apps.

One-quarter of survey respondents claimed a more than fivefold increase in BYOD device connections.

Data, applications and assets that once resided safely behind the firewall are now routinely exposed on poorly managed mobile devices, yielding a litany of serious risks, from data leakage to the introduction of pernicious malware and advanced persistent threats (APTs).

As a result, workers today are as likely to access email, schedules or documents from a smartphone or tablet as they are on a traditional PC. Most rely on some form of mobile app to do so. Enterprises that can strategically optimize that same technology to mobilize business activity can greatly benefit. However, organizations to date have been slow to adopt mobile apps in the workplace.

Based on the Citrix Mobility Report for 2014, Windows-based applications still dominate at work, although the numbers are slowly dropping (down from 64 percent in 2013 to 54 percent in 2014). Mobile apps rose from 6 percent in 2013 to 9 percent a year later; web applications rose from 20 percent to 23 percent; and Software as a Service (SaaS) rose from 10 percent to 14 percent.

The report concluded that IT departments must work to mobilize and manage the different types of applications so they can be delivered in a diverse BYOD environment.

The rise of mobile software in the enterprise has some serious implications for IT shops already burdened with supporting internal IT systems, cloud engagements and BYOD mobility. The Citrix report found that 42 percent of surveyed respondents expected to manage more than 100 apps in 2014, while 21 percent expected to manage more than 1,000 apps.

As a result, IT budgets to support mobile software are ramping up. A May 2014 CDW survey illustrated that small and midsize businesses expect to spend, on average, 10 percent of their IT budgets on custom mobile apps and related technologies. The figure for large businesses was 12 percent. Nearly half of the survey’s respondents reported rising mobile app budgets from 2013 to 2014.

Continued mobile activity points to a future with more mobile apps, delivering an ever larger set of services and functionality, while targeting an increasingly diverse array of tablets and handsets. In short, the proliferation of mobile apps and software poses a major management challenge.

Enterprises moving to mobile must make important decisions, including deciding whether and when to deploy off-the-shelf mobile apps or develop custom mobile apps. Perhaps most important, organizations must transition internal processes and organizational structures to support the diverse application environment enabled by mobility.

**Buy, Build or Virtualize: Mobile App Approaches**

For organizations coming to grips with this mobilized future, committing to mobile apps is a vital waypoint. Enterprises can choose from several categories of mobile client software to meet their mobility goals. These include:
Client virtualization: Virtualization software from Citrix, VMware, Microsoft and others can be used to package and stream desktop applications — or entire desktop environments — to mobile devices.

Productivity apps: Enterprises can procure and deploy off-the-shelf mobile apps, such as email clients from Microsoft and Google, that can support existing business processes and data flows.

Partially custom apps: Rich software platforms can extend the reach of deployed systems, such as Salesforce.com customer relationship management (CRM) or SAP enterprise resource planning (ERP) systems, or create custom apps using visual, rapid development tools.

Fully custom apps: By creating and supporting fully custom apps that are tuned to each mobile platform and operating system, an enterprise can often best meet stringent requirements around performance, functionality and user interface.

Client Virtualization: From Desktop to Device
Virtualization technology has changed how many organizations do business. For instance, the consolidation of multiple virtual servers within a single, physical server has allowed enterprises to streamline many tedious management tasks by pooling and provisioning server assets. The same capabilities that make virtualization so compelling in server environments make it a candidate for delivering desktop applications and environments to mobile endpoints.

Virtualization is a powerful technology that has become nearly ubiquitous in enterprise and server message block environments over the past decade. Server virtualization solutions, such as VMware vSphere and Microsoft Hyper-V, enable IT shops to consolidate multiple virtual servers within a single, physical server. The robust management and configuration capabilities of these solutions have made it possible for organizations to pool and provision server assets. The result: Management tasks that once required physical changes to systems, or that demanded tedious one-to-one interaction via software, can be performed in a streamlined, automated and orchestrated manner.

Research firm Research and Markets expects the general client virtualization market to grow rapidly in the coming years. Part of that growth is fueled by the benefits of applying client virtualization to mobile deployments. By leveraging virtualization, IT teams can:

- Extend the value of investments in existing client software and systems
- Delay or eliminate the need for costly and often risky replacement of existing software with mobilized versions
- Ensure the delivery of fully functional applications and services to mobile endpoints
- Provide a secure and managed environment for applications deployed to mobile endpoints

Productivity Apps: The Off-the-Shelf Option
The debut of smartphones helped initiate a shift from web-centric mobility to app-centric mobility. This “application economy” has had huge ramifications for organizations, which find themselves deploying and supporting numerous increasingly complex and critical mobile apps.

The numbers tell the story: The mobile app market is growing at breakneck speed, according to a 2014 report by research firm Arxan. It found that there were 127 billion free app downloads in 2014.
Mobile user interface

Mobile app deployments demand that organizations rethink the way they make software work. In many cases, traditional desktop applications — dominated by those based on the Windows operating system — are a poor fit for the smaller screens and touch-based user interfaces (UI) found on handheld devices.

Enterprises are looking to mobile apps to leverage the reach and utility of smartphones and tablets. However, the success of mobile apps depends greatly on effective UI and design — much more so than traditional desktop enterprise applications.

Industry surveys show that users will abandon apps that are difficult to navigate. Yet, mobile UI design remains a common problem within apps.

In a 2014 survey of 340 mobile-engaged companies, 57 percent of respondents reported UI design to be the source of at least one-quarter of their discovered app defects. In addition, nearly one-half of respondents reported having to make late changes to app UIs because of:

- Failure to lock the UI design, resulting in frequent changes throughout development
- Failure of the UI design to meet at least one functional requirement
- Discovery of UI issues in the published app by stakeholders

Traditional desktop development approaches that place UI work at the back end are a poor match for the high-stakes challenge of creating an effective mobile app. This is particularly true for cross-platform efforts, which introduce additional complexity to the task. In any app development project, time and effort should be made to ensure the user interface is effectively integrated.

The app roadmap: mobile app strategy for the workplace

Mobile apps are a major aspect of any business's digital strategy. To learn more about how to build and deploy mobile apps, visit our website.

Partially Custom Apps: The Goldilocks Zone

Off-the-shelf apps have known limitations. Built for mass market appeal and subject to the vagaries of mobile platform adoption trends, third-party apps tend to meet most enterprise needs but can leave critical requirements unmet. This is especially true as organizations become large and complex or must support very specific processes and requirements.

Enter mobile apps built on mature app development platforms such as Kony, Salesforce.com and SAP. Unlike fully custom apps built from scratch, partially custom apps offer an attractive “Goldilocks” option for enterprises seeking to balance the cost of off-the-shelf with the functionality and benefits of fully custom apps. To be clear, enterprises that opt to build and deploy partially custom apps have already made an important decision: They have concluded that
off-the-shelf mobile apps cannot meet one or more key business requirements and are willing to invest in custom-built software to meet those needs.

Mobile app platforms offer a cost-effective way for organizations to quickly create and deploy custom mobile apps. They also reflect the unique challenges and issues that arise with enterprise mobile software, which must be built to support:

- Multiple mobile operating systems, each with its own software stack and presentation and interaction styles
- Diverse client form factors, hardware functionality and input methods
- Regular updates to client devices and operating system versions
- Widely varied network connectivity and power conditions

Partially customized solutions ease the burden of addressing these and other software development challenges. Developers can build high-level app logic and user interfaces via easy-to-use templates that are tuned for each engagement. The tooling produces the native application code that runs on client smartphones and tablets.

Some of these tools are provided by enterprise application providers and enable organizations to extend and support these suites. Salesforce.com, for instance, provides the Force.com platform for creating partially custom apps that enhance the capabilities of the Salesforce.com CRM.

Research firm Gartner in its Magic Quadrant analysis last year noted that the mobile app development platform sector consists of a fast-evolving blend of native and web toolkits, as well as a range of specialized platforms that span app generators, wrapper tools and middleware providers. Given the volatile nature of the sector, the report cautions decision-makers to avoid long-term commitments and to frequently evaluate mobile app development strategy.

Among the key benefits of app development platforms:

- Streamlined, rapid app development and faster time to market
- Simplified development experience, often enabled by templates or visual tools
- Integration with included back-end hosting and services
- Efficient support and app maintenance, including the ability to quickly update apps to the latest operating system and device versions
- Reduced need to hire or contract highly skilled native language programmers

Some of these packages enable a single code base to serve multiple mobile operating systems, while providing a more immersive and consistent user experience than cross-platform HTML 5 markup code. The drawbacks? Partially custom apps lack the customizability of native code development.

Organizations may be constrained by the templated nature of these solutions, limiting the ability to fully customize apps and create a unique look and feel. These limitations can be of particular concern with customer-facing apps, where optimal user experience is paramount.

**Fully Custom Apps:**

**When Details Matter**

Off-the-shelf and partially custom mobile apps offer compelling efficiencies, but they cannot match the value of full-on, custom app development when it comes to supporting very specific, complex or niche business requirements. In these and other scenarios, the additional cost of writing fully custom app code is often more than offset by the many benefits that result from it.

**BENEFITS OF CUSTOM MOBILE APPS**

- Increased efficiency
- Increased productivity
- Ability to work remotely
- Cost savings
- Employee collaboration
- Customer communication
- Customer satisfaction
- Ability to use multiple devices
- Competitive advantage

**SOURCE:** CDW, *The App Age: How Enterprises Use Mobile Applications*, May 2014
Fully custom mobile apps differ from partially custom apps in that they are free-standing and not anchored to an enterprise application suite, such as Salesforce or SAP, or a code generator such as Kony. With fully custom mobile apps, skilled programmers write app code directly and compile that code to a specific mobile platform.

This approach offers fine-grained control over all aspects of the mobile app, from UI and UX elements to data handling and integration with back-end systems. Fully custom app code can be rigorously tuned for performance and shaped to handle very specific or complex use cases that off-the-shelf or partially custom apps cannot handle.

The CDW mobile app survey found that nearly all respondents saw benefits from fully custom mobile app deployments. Three benefits — improved efficiency, productivity and the ability to work remotely — were cited most. Furthermore, nearly three-quarters of surveyed managers said they plan to make additional investments in fully custom mobile apps in the future.

The same survey also found that, on average, each employee using a fully custom app was reported to have saved 7.5 hours of time per week. In addition, 82 percent of respondents said mobile apps helped their businesses generate additional revenue, with an average reported revenue gain of 16 percent.

Fully custom mobile app development is benefitting from increasingly sophisticated and capable resources and tooling, such as frameworks that make it possible to write a single code base for multiple mobile client targets. Xamarin tooling, for instance, allows Microsoft Visual C# programmers to create native Android and iOS apps, while Adobe Systems' PhoneGap can translate HTML5, CSS and JavaScript code for iOS, Android and BlackBerry devices.

Organizations considering a fully custom mobile app push may want to weigh the benefits and costs of such an effort against those presented by a partially custom app. A review of a project’s return on investment (ROI) can help weigh the costs of a fully custom app project against the predicted benefits that can be gained with a full–on effort to write code. The objective: To determine if a native custom app will yield additional competitive advantage over a more limited, partially custom app.

**Mobile App Strategies**

Mobile apps are proven solutions for delivering tangible gains in productivity, efficiency and customer satisfaction. Yet, any software development and deployment efforts come with a measure of risk. Those risks are multiplied when working with relatively unfamiliar and fast–moving mobile tools and platforms.

How great is the risk? IAG Consulting surveyed more than 100 large enterprises and found that 68 percent of all IT projects are at high risk of failure due to a poor grasp of requirements and subpar analysis.

For more information on how CDW can help with your mobile app deployment, contact your account manager, call 800.800.4239 or visit CDW.com/mobility.
• Develop use cases
• Determine and select technologies and vendor options
• Formulate relevant metrics
• Set the schedule and pattern for updates
• Establish the role of service contracts
• Consider issues around business process transformation and ongoing lifecycle

Establishing the Foundation

The first three steps define the audience, scope and function of an app. They are directly responsible for both driving and promoting mobile deployment efforts.

Research firm Gartner urges enterprises to establish a mobile center of excellence, gathering mobile-engaged stakeholders into formalized roles so they can coherently respond to issues and help direct decision-making. Because mobility touches so many aspects of an enterprise, this group should be diverse in background. Departments that may be represented include IT and security, line of business, marketing, sales, operations, human resources and legal. The team should work together to craft coherent mobile policy and strategy for the enterprise.

For specific mobile deployments, representatives from affected business units should be engaged, with units working together to ensure that processes and operations are adapted to new app solutions. For instance, a mobile app that enables intake of specifications and data for manufacturing will almost certainly require changes in the way information is delivered to engineers and supervisors.

Executive engagement is paramount, and mobile leadership teams should work closely with executives to communicate the project mission, budget expectations and well-researched projections for ROI. These communications must be sustained throughout the project lifecycle to ensure ongoing support from top management.

From a process perspective, it is vital that teams talk coherently about the operational activities that are affected by a mobile app rollout and develop detailed use cases that verify the validity of the proposed approach. An engagement that devolves into a list of desired program features will almost certainly fail to address the underlying need.

The first step is to identify the problem and perform a full assessment that examines, in detail, the existing process and how it is conducted. Interviews with users and a review of job roles and activities are vital at this stage. From there, a coherent plan to mobilize and improve the existing process can be crafted. It can also help to see how industry peers are executing similar processes.

Crafting detailed use cases for the mobile app deployment is the next logical step. Here, the mobile team works with all stakeholders to propose specific use examples. For instance, a stadium operator might document use cases for a smartphone app that enables in-seat concessions purchases and a beaconing system that enables the app to suggest shopping opportunities to customers based on where they are in the venue. A detailed use scenario helps every aspect of the effort — from giving the app development team a tangible target to driving more accurate cost and ROI projections.

The effort to establish use cases can yield unexpected benefits, such as discovery of secondary use cases that extend the value of the initial mobile app proposal. Such efforts will need to be properly scoped, of course, to prevent mission creep that can produce cost and time overruns.

Taking Action

Once the initial groundwork is done, the project can move into the action phase. This phase includes selecting technologies and vendors, formulating relevant metrics, and setting update schedules and patterns. The nature and course of these activities will depend to a large extent on the type of mobile app being deployed: virtualization, off-the-shelf, or partially or fully customized.

Once the team has identified the approach, it can identify candidate technologies, solutions and vendor companies. Decisions must be made across a matrix of issues that includes technology platform alignments, integration challenges, industry-specific requirements (including regulatory compliance), cost considerations and future mobility planning. In many instances, organizations may want
to engage a third-party service provider to help assess and recommend solutions and vendors.

Defining metrics is an important step that allows enterprises to track and gauge the effectiveness of a mobile app deployment. Metrics should be developed through careful consideration of what defines success or failure in the project. For instance, an app initiative that measures success in terms of downloads, rather than in terms of actual usage of the app, may fail to detect that registered users are not using the software — a clear sign of failure.

Key metrics to consider for a mobile app effort include usage, user lifetime value, session length and interval, user acquisition and retention, average revenue per user, and performance metrics such as app launch and load times. In-app instrumentation and telemetry help to capture user behaviors and interactions, allowing developers to pinpoint poorly executed or little-used features. This intelligence can be used to drive updates and improvements to the app.

Detailed metrics can also help mobile apps meet service contract and service-level agreement commitments. These can be especially important for enterprise apps deployed to partners and internal operating units. The contracts can be used to define expectations and shape decision-making in the development phase. Performance issues around uptime, availability, responsiveness and software quality are all relevant. In the case of performance shortfalls, such as extended downtime, a refund or other restitution may be made.

Mobile apps represent a major opportunity and profound challenge to organizations of every type. Device-bound apps can create new efficiencies, enable compelling user experiences and support vastly enhanced business processes that promise gains in revenue, productivity and customer satisfaction. Solid forethought and planning are needed to achieve this promise.

CDW: A Mobile App Partner That Gets IT

CDW has been delivering mobility products and services to customers for many years, providing a wide array of IT solutions. More than 250,000 organizations count on CDW as a trusted partner because of its collaborative approach to solving IT challenges. Because they partner with vendors throughout the industry, our account managers, solution architects and advanced technology engineers are able to offer clients knowledgeable, in-depth advice on their technology initiatives.

CDW experts listen closely to customers. We use our experiences and feedback to continuously shape and improve offerings and services and to help enterprises make the best possible decisions around mobile software development and deployment.

CDW account managers and solution architects are ready to assist with every phase of your mobile app deployment. The CDW approach includes:

- An initial discovery session to understand goals, requirements and budget
- An assessment review of existing environment and definition of project requirements
- Detailed manufacturer evaluations, recommendations, future environment design and proof of concept
- Procurement, configuration and deployment of the final solution
- Telephone support as well as product lifecycle support

To learn more about how to keep pace with the mobile revolution, read CDW’s white paper

*Mobile Procurement: Cleared for Takeoff.*

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