Business white paper

# Transform to m-Government

## For higher productivity, lower costs, and improved interactions

## Abstract

In today's environment of constrained budgets, government resources are stretched to their limits. Employees are seeking ways to extend government's reach, and to become more efficient. Citizens and businesses look to government to become more responsive, transparent, and available on a 24x7 basis. Further, constituents want government to provide "customer service" on par with the best of commercial enterprises. To achieve these goals, mobile technologies may hold a valuable key to transforming government IT.

Just about everything around the world has gone mobile. A government service delivery that incorporates mobile technologies has the potential to increase productivity, reduce costs, and change how we work, live, and interact with our government agencies. But the adoption of a mobile-based lifestyle presents both tremendous opportunities as well as stiff challenges, especially for public-facing organizations like government, education, and healthcare. To create a mobile government, or "m-Government," that delivers impactful services, public sector organizations must possess operational strategies that optimize the use of mobile technologies that support employee process automation, citizen services delivery, and business models that "do more with less." This white paper discusses key mobile trends in government and methodologies for IT application development, testing, monitoring, and the management needed to create a transformed m-Government that provides secure and intelligent mobile services.

### Table of contents



## Mobility in government trends

Internet services and mobile application deployments on wireless and mobile devices have grown rapidly in recent years thanks to the mass adoption of laptops, tablets, and smartphones by both a growing mobile workforce and consumers. Smartphone and tablet ownership has been on a steady rise the past two years with more than 250 million smartphones and 125 million tablet owners in the U.S.[1] According to Forrester Research, by 2016 there will be more than a billion global consumers with smartphones and tablets, a conservative estimate compared to Ovum's 1.7 billion by 2017[2]. Even less industrialized countries with second-generation cell phone penetration and less advanced networks are delivering voice and SMS services to billions of users. Mobile phones not only facilitate communication anytime, anywhere, but they've become smart devices with services and apps that increase productivity, convenience, and interaction. Consumers depend on their devices for personalized communications, but from this same device, they expect improved interaction with government.

### Convergence with mobile devices

The mobile device with converged purposes and more effective delivery of services has not gone unnoticed by government entities or organizations that track what governments plan to do. In May of last year, President Obama stated, "Americans deserve a government that works for them anytime, anywhere, and on any device. By making important services accessible from your phone and sharing government data with entrepreneurs, we are giving hard-working families and businesses tools that will help them succeed." His Office of Management and Budget (OMB) followed up this statement with the issuance of a mobility strategy, and his CIO, Steve Van Roekel, over the last year, has further integrated this mobile strategy with his digital government roadmap. Most recently, to ensure government's mobile convergence is secure, the U.S. Digital Government Strategy (DGS) released the detailed Mobile Security Reference Architecture (MSRA)[3].This flexible architecture for mobile computing is designed for use by any department or agency.

Like other disruptive technologies in the past, mobile services will have a transformative effect on government. We've already seen a fundamental shift in consumer behavior and patterns when government agencies first shifted to an Internet-driven "e-Government." Expectations are just as high for a mobility-based m-Government. This shift will once again create changes in the rules of engagement between constituents and public sector organizations. The Internet has enabled and emboldened citizens to expect greater efficiency and transparency from government. Mobility will only accelerate these expectations in a push for a transformed experience.

[1] Source: Forrester Research Mobile Adoption Forecast, 2012 to 2017 (U.S.); Forrester Research Consumer PC and Tablet Forecast, 2011 to 2016 (U.S.)
[2] "Smartphones in Emerging Markets: Shifting Landscape," Ovum, September 2012
[3] "Mobile Security Reference Architecture," Federal CIO Council and Department of Homeland Security, May 23, 2013

**m-Government services growing**

m-Government services are sprouting up throughout the world. In less industrialized countries, many of these services are in the first or second phases of government connection without any wire-line, thick-client predecessor, or counterpart services platform, such as emergency alert services over SMS text to second-generation and above cell phones. Some of these services have profound social and economic impacts on citizens as they bridge the digital divide. For example, the Sri Lankan government launched an SMS service targeting rural farmers with seed and fertilizer market pricing changes as well as nutritional and health information.

Governments are beginning to embrace mobile technologies as a simpler and more cost efficient way to support self-service and improved employee productivity through streamlined process and field automation for workers in social services, law enforcement, inspection, and military. Likewise, government agencies and departments will provide their constituents with the ability to interact with them, handling as much of that interaction remotely from wherever they're located. They will make it convenient for people to complete critical transactions such as registering to vote, renewing their driver's licenses, applying for unemployment, reporting a crime, or any number of services at the local, state/provincial, or federal level.

Constituents will expect these new services to be streamlined, customer-friendly, and prescriptive in nature by offering advice based on automated rules, or providing guidance at points when the constituent needs to move quickly through a complex process. They will expect convenience, efficiency, and empowerment at every stage of their mobile interactions with government. The mobile experience is instant as people no longer need or want to wait to get online at a later time from a tethered computer in an office or home. They want to take immediate action—but intelligent, location-based action. m-Government will be the thrust of a trio of government initiatives, combined with global information systems (GIS) and business intelligence (BI) analytics tools[3].

We have only begun to scratch the surface of mobile technologies' potential to change our lives and the way we interact with our communities and government.

## Transitioning to a mobile environment

Mobility has altered consumer behavior and is reshaping the opportunity to increase and improve interactions with citizens and program beneficiaries. For example, the use of a mobile device with m-payments removes any stigma from using income assistance programs for purchase at retail establishments. It also adds one more layer of security with a stronger identity management. Changes to centralized funds allocation to assistance programs can be better tracked and managed when the end-point payment device is specific to the individual and his/her mobile device. Combining payment history with GPS information (provided policy allowed for and individuals agree to tracking) and analytics can tell you how much is being spent on poor nutritional choices and the correlation of these choices to proximity of supermarkets vs. convenience stores to the program beneficiaries' residences. Police patrols routinely carry laptops in squad cars that are tied to law enforcement systems, but imagine if this intelligent tether was tied directly to the police officer on foot patrol or as part of community policing programs. Examples such as these highlight subtle yet impactful changes a mobile world can have on our societies.

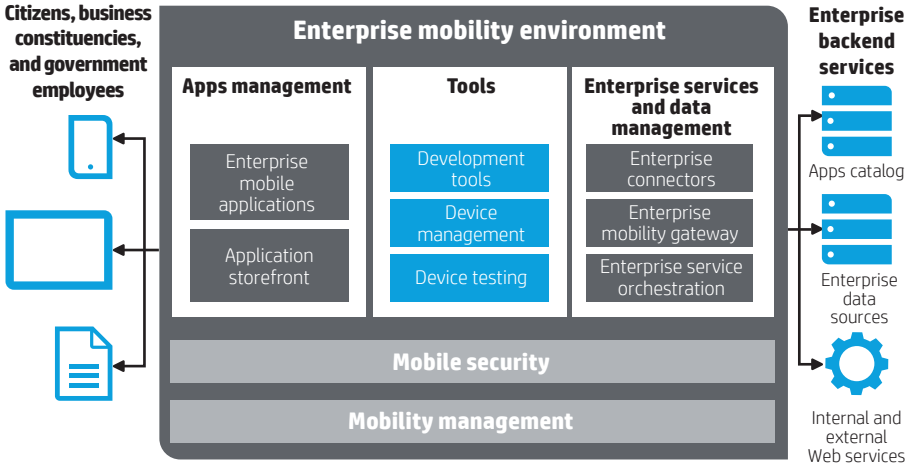
**BYOD on the rise**

As government employees become increasingly reliant on their mobile devices, the trend toward "bring your own device" (BYOD) will only persist. Research suggests that many employees who use their personal mobile devices for work do so without expressed permission from their IT departments. It is imperative that government organizations put in place a BYOD policy that both supports and manages these mobile devices in the workplace. However, BYOD should be considered just one part of your overall mobile acceptable use policy (AUP). Even if you were to limit employees to the use of ONLY your government-furnished equipment, you still must contend with the increased security risk of confidential or classified materials residing inappropriately on these devices. Security risks created by application and integration vulnerabilities on mobile devices are also likely with non-BYOD environments.

[3] The Convergence of Mobile, BI and GIS Will Create Opportunities for Smart Government, Jeff Vining, Gartner, March 2012

The advantage of government-to-employee m-Government should not be viewed solely from the employee perspective. Combining mobile field automation with GIS and real-time data collection and analytics can also provide a better common operational picture between management and those employees, providing insight into how to improve process and speed delivery of services or response by government resources.

**Figure 1.** Enterprise's mobile environment




By taking a strategic view towards AUP and BYOD, IT leaders can assess the appropriate level of mobile support necessary for each job function. To realize the true benefit of BYOD and manage the possible risks, IT leaders must support a level of mobile access that is appropriate, fast, and secure. This is no small feat given the different enterprise systems that support the running of a business and the variety of devices and tools employees increasingly use to perform their jobs.

### Translating mobile workforce considerations into acceptable use policies

There are four key considerations when extending enterprise apps to the mobile workforce on personal mobile devices.

First, IT must address issues around the end-to-end security of devices, apps, and data. Since employees own the devices, the IT department may also have limited access and control over them unless they segment work apps and data from the employees' personal artifacts. It's not just a matter of having the mobile device management (MDM) capability to wipe all or part of the employee's personal device. Security of the data and services must be ensured whether in transit, on local mobile devices, or cached in intermediary repositories. No longer confined to the four walls of a government agency or the internal network, personal devices are exposed to significantly greater external risks, and limited tools are available for enterprise-grade security of consumer devices. The AUP is far more critical: it's a matter of setting policies about the use of the device, policies to manage security controls, and automating implementation of those polices and information management as to what, when, why, and how information and applications reside on that device—regardless of whether it's government or employee-furnished.

Second, IT must proactively manage the mobile access provided to its core enterprise systems and data. The level of accessibility must be appropriate for the type of job being performed and have strategic value to the government department and its core missions and projects. For example, what type (i.e., read/write/both) of mobile access should social services case workers be given to the case management systems or other constituent records on their personal devices? Should that access still be available when they leave their offices or the "field" at the end of each day? Left unmanaged, mobile accessibility not only introduces unnecessary security risks, but it also compromises the functioning of core enterprise systems. The back-end system could be overburdened and latency issues could result.

Third, the type of application development undertaken must be meaningful (i.e., high-performing and user-friendly) while practical (i.e., fast and flexible). It is infeasible to invest the kind of time and effort that traditionally goes into enterprise application development when developing mobile apps. There are many different application development platforms for a growing list of function-rich devices. IT must be judicious about which platforms to support, being mindful of sustainability and cost issues.

Fourth, cost and return on investment (ROI) must be considered while securing, managing, and building these mobile extensions to your enterprise systems. An increasing number of employees who own smart devices and use them for work will help drive the economic justification for deploying enterprise apps on personal devices. However, the near-term hardware cost-savings must be compared to the overall software development and support costs (personnel and infrastructure) to determine the true value of BYOD for different job functions within an organization. Some costs will be difficult to manage—what cost should be associated with the risk incurred from a security perspective? A clear understanding of the value of all assets touching mobile access must be accounted for as a baseline for such a calculation. ROI calculations must also take a rational approach to risk assessment around employees potentially responding negatively to their government employer wiping their device due to some violation on their part. There will always be a chance of this occurring, and quantifying legal fees and payout to employees in some cases must be weighed against savings from BYOD.

Once these four considerations have been taken into account, and decisions have been made regarding the level of mobile access to support, the IT department can work with existing application and tools vendors and system integrators to decide upon the best approach toward mobility.

With consumers increasingly turning to their mobile devices, government must have a mobile presence that is engaging and meets the needs of the mobile constituent.

**Business partner collaboration**

As government employees request greater mobile access to core enterprise systems, business partners (e.g., supply chain vendors, delivery agencies, etc.) will also likely request greater mobile access to collaborative government systems. For example, a commercial contractor or non-governmental organization that you partner with may request mobile access to your procurement and bid systems, records systems, and other systems to improve their ability to deliver on contracts on your agency or department's behalf. This type of enablement benefits not only your partners but also your organization. Partners enjoy greater efficiency while the government delivers better service. This is just one example of how mobile technology can be applied to improve workflow not just within an organization but also within its partner ecosystem. Of course this means extending your AUP and reviewing those of your business partners and considering factors similar to the four listed earlier in this white paper for BYOD.

**Constituent engagement**

While a mobile agenda that supports BYOD and workflow improvement will lead to enhanced workforce productivity and operational efficiency, most government organizations'—particularly those that are citizen-facing and deliver program-based services—most pressing mobile agenda element is to support and engage their increasingly mobile constituents.

One interface for government organizations to connect with mobile constituents is through a basic mobile Web application. Here, a constituent accesses websites configured for a mobile device's small screen monitor. A second interface is downloadable native mobile apps. These apps are designed and developed specifically to run on a particular device operating system and machine firmware with functionality specific to a device's camera, near-field communications unit, or other peripheral. Even though native mobile apps are costly to develop and manage because the code is specific for a particular class of mobile platform, in some cases, governments are choosing to invest in them, because they enable governments to have a deeper, more impactful, and differentiated engagement with their constituents.

Research has found that click-through rates, usage duration, and usage volumes are higher with native mobile apps than with mobile Web apps. Government organizations can design native apps that leverage the device's hardware capabilities and faster processing power. Both mobile Web and native apps have their architectural advantages and disadvantages along with cost and security constraints. Depending on the particular government departments' mission, process, and budget, one interface may be more appropriate than another. Government organizations will need to look at the tradeoffs for each and decide how best to allocate their IT budgets.

In addition to these two mobile app types, a third type is rapidly emerging called hybrid mobile apps. These hybrid apps are cheaper to build than native mobile apps and offer greater cross-platform compatibility and access to hardware capabilities. A hybrid app may leverage a standard development environment to build repeatable modules that would be used across multiple phone platforms and augment those with native modules around specific functionality, such as image capture with the device's camera.

These are still early days in the mobile technology revolution. Consumer—and therefore constituent—behavior is evolving at a fast pace and the apps must keep up. Government organizations will need to not only develop quickly but also take an iterative approach in finding the best ways to engage with citizens. The number of touch points with the constituents will increase with innovation and, while fragmented today, government must work toward an IT strategy that provides a positive, integrated, and consistent m-Government experience across all touch points. The challenge is to create the apps quickly, cost effectively, and with quality that enhances citizen affinity.

## Developing a multi-client mobile environment portfolio

In the previous section, we discussed the trends emerging in government's use of mobile devices and the transition these organizations will need to undergo to support and engage with an increasingly mobile constituent base. HP Software provides the software and services that empower IT teams to develop, test, monitor, and manage a software portfolio for today's mobile world.

**Project and portfolio management**

Mobile technologies are driving innovative projects across organizations. As a shared services team, the number of projects the IT team considers and ultimately manages will only multiply with mobility, and you will need an enterprise view of those projects with an eye for reuse and modularity in design and implementation as a Center of Excellence (COE). HP Project and Portfolio Management (HP PPM) software can help with demand, financial, project, and portfolio management, providing real-time visibility into the investments made, at all times and from multiple perspectives. HP PPM integrates with the HP Application Lifecycle Management (HP ALM) suite so that demand-driven plans rapidly translate into a multichannel application project portfolio.

More than likely, your organization will develop a portfolio of applications—some will be extensions to existing thick-client desktop apps, others purely for mobile targets. One U.S. study estimated that for U.S. Federal projects, total cost per app will run between $100,000 and $150,000[4]. Actual figures would be different, of course, in different countries, at different government levels and organization sizes. Regardless of the average figure, you will be required to estimate the cost of each project, including the actual infrastructure and software licensed to support your mobile devices. Accurate investment must be calculated based on the assets used and their deployment configuration and dependencies. Use of HP Asset Manager and HP Universal Configuration Management database are essential tools to support this effort.

[4] Federal Mobile Applications: Lessons Learned and Best Practices in Supporting the Mobile and Digital Agenda to Enhance Citizen Services, BizTechReports, 2011

**Mobile application lifecycle management**
HP Application Lifecycle Manager (ALM) provides a unified platform for managing today's rapidly changing apps, from design to delivery—including the extensions necessary to handle mobile applications. It enables collaboration and the reduction of cycle times between application teams that may be working in a variety of development methodologies, from Waterfall to Agile. It also manages and connects disjointed work processes related to project planning, requirements modeling and management, and development. As the number of application releases, upgrades, and updates steadily increases with a growing number of mobile projects, it is necessary to have a platform that can support consistent, repeatable, and standardized processes that deliver secure, fully functional, high-performance mobile app portfolios.

**Requirements management**
Providing requirements for mobile app development will be less straightforward, since much must still be learned about constituent behavior around mobility. It is therefore imperative that government service delivery organizations—the "business-side"—and IT application teams align closely in managing the requirements for mobile projects. HP Requirements Management is a core module of HP ALM that supports distributed project teams with defining and managing requirements. It enables requirements to be either built into the module or imported from multiple sources.

Requirements gathered from multiple sources, taking into account the broad array of technology options, can be analyzed based on business process models, created within a template, and standardized and linked to HP ALM artifacts, all within the HP Requirements Management module. By maintaining multidimensional traceability among requirements, source code, tests, and defects across releases and cycles in a single, centralized repository, the teams can react to changes and corrections at a much faster rate. As a result, they can develop more refined and higher quality apps. This approach would be essential for a mature COE or shared services team.

**Development and release management**
Development teams need a platform for developing, distributing, managing and—in the case of employees—consuming enterprise applications and information. HP Anywhere 10 enables developer teams to design, build, test, and publish mobile apps, incorporating an HTML 5 hybrid container (critical for mobile Web app modular reuse across multiple client OS targets) and an Eclipse plug-In with a simulator and hot-deployment SDK.  Most large government departments or services shared across them will have an app portfolio that, when deployed, will require an app store or catalog. HP Anywhere 10 provides developer communities with a centralized enterprise app store platform with collaboration and workflow tools to support publishing to the store, push notification for employees subscribing to it, and a centrally managed container with governance and access policies to support AUP implementation for BYOD.

Once your teams get rolling on mobile app development, there is a danger that your operations platforms will face a release backlog—multiple versions of apps for multiple devices and OS versions—preventing new functionality from being implemented or security holes from quickly being plugged. In fact, in Agile environments, the goal is to build, test, and deploy smaller, "bite-size" application functionality to reduce risk and speed time to value. Thus m-Government service delivery will require HP Continuous Delivery Automation (CDA), along with HP ALM described above, to support rapid development and release of new apps. HP CDA facilitates more efficient development and delivery in COE and shared services environments by allowing them to automate pooling and provisioning resources as a lab environment in which to model, build, test, and verify multiple releases. With CDA, you'll be able to achieve standardization and consistency needed to achieve high quality and avoid errors and rework.

## Functional and performance testing

**Quality management**
Consumers, particularly mobile ones, are impatient and demanding. In the commercial arena, when a customer encounters poor service with a mobile application that doesn't work or takes too long to load, they can move on to another vendor. However, with government, they'll simply go back to using face-to-face or other more expensive service delivery channels, defeating your justification for the investment in mobile service delivery.

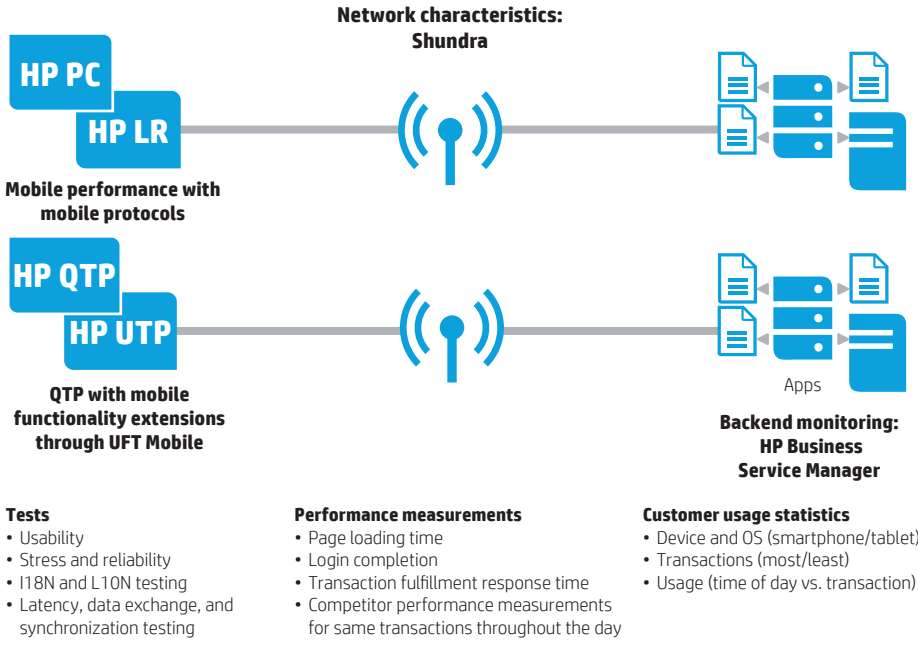
Poor application quality results in not only a return to less efficient means of government service delivery, but it also damages hard-earned goodwill and tarnishes the improvements in the perception of the quality and transparency of government itself. To ensure this never happens and apps run as intended, government must manage application quality. HP Quality Center (QC) is designed for teams handling multiple programs simultaneously—typical in shared services and COE development environments. QC provides a single integrated platform for requirements management, release and cycle management, test management, test execution, version management and base-lining, and defect collaboration and management. It provides a consistent, repeatable process for testing with quality assurance traceability and visibility across the entire process. It is a core part of HP ALM and provides comprehensive test management.

**Functional testing**

Functional testing is the key to ensuring an application works as expected from user interface to back-end services. HP Unified Functional Testing (UFT) software accelerates functional testing by simplifying test design and maintenance for both graphical user interface (GUI) and application protocol interface (API) apps. By providing automated functional testing that supports agile and continuous development processes with both real devices and emulators, HP UFT provides functional and regression test automation for every major software application and environment. This includes advanced Web 2.0 toolkits, native and Web-based mobile apps, leading development technologies, headless services, and enterprise resource planning (ERP) and case management apps.

Included within HP UFT is HP QuickTest Professional (QTP) software, which provides automated functional testing of transactions and services that spans multiple application layers and composite apps. This is an important capability for testing mobile apps to enterprise-grade levels—native or browser-based—since they are likely to be an extension of composite application, multilayer environments. By testing the complete functionality of an integrated scenario with HP QTP, quality assurance teams can find defects that may otherwise be missed, cut time-to-delivery by accelerating both service-testing and load-testing processes, and reduce training and tool costs by adopting a single solution that addresses GUI, headless, and multilayer testing.

**Figure 2.** A complete, end-to-end performance testing solution for mobile apps




HP functional mobile testing is further extended to test mobile apps with HP UFT Mobile. HP UFT Mobile is an execution of HP QTP that enables scripting on emulators and real devices. This solution enables enterprises to naturally extend their existing HP functional testing and ALM environment to support mobile apps. The HP UFT Mobile private cloud of dedicated devices provides a private and secure mobile test environment that leverages real devices connected

to live networks around the globe. Ideal for agile software development, HP UFT Mobile runs automated test scenarios across devices, and easily scales to support intensive regression and functional testing.

**Business process testing**
Given the evolving nature of m-Government, operations analyst and quality assurance teams need to work closely together to define use cases and process flow, and use them to create reusable testing components. Doing so will increase the accuracy and speed of tests in a rapidly changing mobile environment. HP Business Process Testing software enables test engineers to define tests based on the defined business process flows, create and connect reusable test components using both manual and automated methods, and share them with distributed quality teams for ongoing testing within HP Quality Center and HP ALM.

**Manual testing**
One of the key roles of a mature team is to transition as much manual to automated testing as possible—best in class can be as high as 60 percent but generally most new projects can start with as little as 10–15 percent automated. While automated testing with HP UFT brings much-needed efficiency to the functional testing of mobile apps, manual testing is often still required to accomplish certain testing objectives that HP UFT cannot perform. HP Quality Center Sprinter, a core component of HP Quality Center and HP ALM, provides manual testing processes and tools. While manual testing is labor-intensive and not efficient to scale, manual testing can be helpful in improving and iterating mobile apps, as it offers an opportunity to test and examine the application at a level of detail that would be overlooked with automated functional testing.

**Performance testing**
Aside from functional testing, mobile apps must go through rigorous performance testing to ensure their robustness under different loads on a variety of devices. Potential performance bottlenecks need to be identified, diagnosed, and fixed. Often, performance testing fails to incorporate the significant impact that mobile apps can have on the overall enterprise system. And when teams conduct mobile performance testing of their mobile apps, they often do not factor in the impact that the network can have on performance.

Network performance is a critical part of the performance challenge. A shared network can be overcrowded from time to time (e.g., during peak tax return days or voter registration periods) or can simply have limited capacity. It is in these instances that mobile apps can have sluggish performance or crash. For governments, if a crash or even less-than-ideal performance should occur during certain known periods like elections or tax seasons—or worse, during a disaster response event—it would have a devastating impact on government operations and constituents' perception of their government.

For example, governments of major global and regional tourist destinations must do everything in their power to keep tourists happy as a way to increase revenue. m-Government services can support every aspect of the tourist experience with accurate and timely information. A traveler can check government approval ratings on tour companies, hotels, and restaurants in real time. They can obtain alerts about weather or travel delays and make alternate plans that do not waste their time and money. Decisions and transactions are made in an instant. Government performance is critical as the fragile nature of tourism can quickly turn a positive experience into a nightmare.

HP solves the mobile testing problem with a comprehensive solution for testing the performance of mobile apps. The solution is built with a combination of capabilities from HP Performance Center (a multiproject-oriented version of HP LoadRunner) and HP Application Performance Management software, along with partners like Shunra Software that offer virtualization capabilities.

HP LoadRunner and HP Performance Center (which is geared toward Centers of Excellence) offer a comprehensive solution for testing system behavior and performance. HP LoadRunner drives production workload to the test environments, removing the main barrier to performance testing across apps. As it drives load against the system, HP LoadRunner captures the end-user response time to key business processes and transactions to determine whether the business results delivered are satisfactory. Nonintrusive, real-time performance monitors obtain and display performance data from every application tier, server, and system component.

This level of detailed information is critical. If government organizations are to be successful at providing their constituents with the best experience, they need to be able to monitor and obtain real-time performance data and correlate it with transaction data to quickly pinpoint any problem areas and resolve them in the shortest time possible.

HP Mobile TruClient and HP Mobile Applications are two protocols in this solution that can help to build scripts faster and easier for the broadest range of apps and protocols, including new mobile and Web 2.0 technologies. Built on top of HP TruClient technology, HP Mobile TruClient helps record browser-based apps directly through the browser.

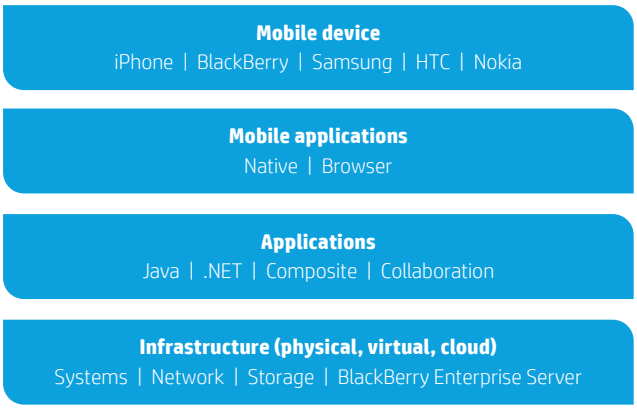
For native mobile apps or for any other app that can't be recorded using HP Mobile TruClient, HP Mobile Application protocol enables Web scripts to be built using agents on the device or through emulators. Using these protocols, the performance testing team can capture mobile traffic and generate realistic mobile load on the system under test. It has the ability to record and replay at many architectural levels, from the GUI level down to the transport and socket level, depending on the skill set available and the level of customization required. The performance test scripts can also be reused to monitor apps in production using HP Business Process Monitoring (BPM).

To enhance test accuracy, HP LoadRunner can also incorporate real-world network connections into the load and performance test environment by using Shunra's extensions to HP LoadRunner and HP Performance Center, where almost any network (2G, 3G, or 4G LTE) can be simulated during testing. This ensures the test results are more reliable and accurate. HP LoadRunner, along with Shunra's extensions, provide the most comprehensive performance testing solution to measure system performance and identify bottlenecks and performance problems when testing mobile apps.

### Service virtualization

Even without the additional demands from new mobile projects, project teams are developing and testing in constrained environments. HP Service Virtualization software can help by simulating actual service components' behavior, enabling the tester to begin performing functional and performance testing even when the real services are not available or when they are not suitable for the particular test. The tester can rapidly create simulation models from service interface specifications, recorded from real or logged communication among components; loaded from static data sources, spreadsheets, and databases; or reused from a previously finished testing project. This flexibility adds significant value and speeds time-to-market when developing and testing for mobile apps, in addition to cloud and other composite apps. HP Service Virtualization integrates easily with HP UFT and HP Performance Center.

**Figure 3.** Layers of mobile business services




### Application security testing and continuous monitoring

Aside from quality and speed, security is also very important in developing and deploying mobile apps. HP Fortify Software Security Center fixes and prevents security vulnerabilities in apps. Increasingly, software security assurance will be a baseline requirement for m-Government service delivery. It mitigates software security risk by helping to ensure that all apps—whether built for desktop, mobile, or cloud—are trustworthy and compliant with internal and external security mandates. HP Fortify Software Security Center helps secure

all software in the enterprise, regardless of whether it is developed in-house, procured from third-party vendors, or running in production. HP ArcSight and HP TippingPoint would then be used for continuous monitoring and intrusion prevention and detection. In the U.S. Federal Government, significant revisions are underway on key cyber security standards, such as the National Institute of Technologies special publications (SP) series, comprehensively covering Federal security. One of the cornerstones of this series, SP 800-53, has just been revised and released in April 2013[5] and the Mobile Security Reference Architecture from the CIO council in May 2013.

## Monitoring

Even after putting mobile apps in service, government organizations must actively monitor these apps to ensure constituents experience superior quality and performance. Application performance management is certainly not a new function for IT, but supporting mobile interaction adds a significant layer of complexity to monitoring. For example, mobile apps run on a matrix of devices in different locations, making it hard to pinpoint issues when they occur. In addition, monitoring becomes more fragmented as users access the same app from more than one device—such as a PC in the office and a smartphone on the go—and as apps and data migrate from the device to the cloud.

**Figure 4.** Monitor mobile business services across the entire IT Infrastructure


These are just two examples of the added complexity mobility brings. IT will need a solution that can monitor the health of mobile business services from various mobile apps, mobile devices, carriers, and locations, as well as the supporting back-end application and infrastructure to pinpoint problems with laser precision.

HP Business Service Management (BSM) software provides a comprehensive solution for proactively monitoring both traditional and mobile apps and services across the entire IT infrastructure. HP BSM monitors the health of the mobile app as experienced by the end user, and provides the necessary diagnostic details to quickly isolate issues. HP BSM accomplishes this through either synthetic or "real user" monitoring. With synthetic monitoring, HP BPM emulates the end user's experience for certain mobile app tasks as performed on various devices by running prerecorded scripts at regular intervals from various locations. HP BPM provides consistent and predictable measurements for proactive notifications if a page cannot render or is performing at an unacceptable level. For "real user" monitoring, IT can see how end users are truly experiencing the service on their mobile devices and pinpoint mobile app performance issues.

A third way to monitor mobile Web apps is via HP Diagnostics. HP Diagnostics is transaction-tracing software that allows operations teams to pinpoint problems as the transaction traverses across the firewall to the "batch" server and everything in between those endpoints. HP Diagnostics is critical to effectively determining the root cause of application performance and availability issues.

Mobile apps are either built on existing business apps or new cloud-based services. So in addition to monitoring the mobile app, it is equally important to monitor the health of the supporting infrastructure layers (back-end apps, systems, servers, operating systems, network, physical, or cloud environments). HP Operations Management Center helps monitor, diagnose, and prioritize infrastructure problems, based on business impact. It also supports consolidated operations by providing an integrated operations bridge that consolidates event and performance data from physical, virtual, mobile, and cloud sources in order to reduce duplicate monitoring and boost productivity.

By combining all layers, it is possible to gain a complete view of the entire health of the mobile service. This is commonly referred to as a service model and is easily modeled and kept up to date in the HP BSM Run-time Service Model (RTSM), a dynamic, real-time business service model/topology. HP RTSM delivers the unique ability to capture and leverage data collected from a variety of real-time data sources and apply it to the challenges of maintaining service health, event correlation, and application management in a dynamic enterprise. Having a comprehensive operational view of mobile business services is important in establishing service levels, tracking performance and availability, and quickly isolating issues across complex mobile app environments.

[5] http://nvlpubs.nist.gov/nistpubs/SpecialPublications/NIST.SP.800-53r4.pdf

**Learn more at**

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Test drive CDA
**http://www8.hp.com/us/en/software-solutions/software.html?compURI=1234992#.UY8iOmxApjo**

Test drive BSM
**http://www8.hp.com/us/en/software-solutions/software.html?compURI=1170734#.UY8iumxApjo**

For information on unifying security and IT operations in government, go to:
**http://h20195.www2.hp.com/v2/GetPDF.aspx/4AA4-6905ENW.pdf**

For information on HP Software's government cloud solutions, go to:
**hp.com/go/hpswpublicsector**

Just as there will be aggressive demands to develop and test mobile apps at a rapid pace, there will be equal demands to monitor these apps once they are put into service.

HP BSM is able to reuse scripts, knowledge, and expertise from HP ALM, allowing IT operations to collaborate with application developers much earlier in the lifecycle. This collaboration is highly beneficial because insights from HP Real User Monitoring software can be incorporated into test scripts to reflect real user behavior, a key benefit if government organizations want to provide the best experience for their constituents. Aside from script sharing, operations and development teams use the same toolset (HP Diagnostics), process, and knowledge. This way, it is possible to manage apps better, resolve issues faster, and improve overall quality, while keeping support costs down.

## Conclusion

m-Government will usher in an era of constant innovation and government IT organizations must prepare for constant change. The commercialization of mobile technologies will continue to be powered by improved mobile network speeds, new hardware capabilities, and innovative software apps. As Governments extend their apps and services from e-Government to m-Government—ranging from innovative, citizen-focused apps to streamlining government-to-business services—they must take a few strategic steps. These include developing an integrated mobile front-end for existing online services; sharing, synchronizing, and analyzing the data across all channels; and providing full access to supporting apps on the back end, while factoring in latency and variable network speeds. These steps can only be performed by a COE team using the proper tools and process to deliver reusable modules and services.

Innovative countries like Singapore have taken a 311 (single non-emergency number services found in many major cities around the world, often backed by a call center and a Web portal) approach with a single mobile phone number and mobile website, front-ending over 150 disparate government services. This sort of front end makes perfect sense and is most appropriately supported by a back-end COE that is focused on the development, testing, deployment, monitoring, and management of a high-quality (functional, performance, and security) set of m-Government services. Care must be taken not to overlook the testing and monitoring of these apps and services, which will determine governments' success. Even as governments explore the effectiveness of different service delivery strategies, they must always strive to improve their constituents' perception of them and how well tax dollars are being spent to deliver services, thereby ensuring quality and performance.



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