Mobility: The New Enterprise Platform

Within the Nexus of Forces
Introduction

Stand in front of any enterprise audience and ask them to pull out their phone. Probably more than 99% of the people present will put a mobile device in the air. This device is most likely to be a smartphone – a device intimately connected to the way that person lives their life. In all likelihood the individual will have looked at that device within the last 15 minutes. In many organisations, this is a device that the individual selected and paid for themselves. It's an expression of their individuality. Collectively, the combined computing power of all these devices would rival the computing power of many enterprise computing platforms – and yet it is outside the firewall of the enterprise – the “Wild West” of computing platforms.

This platform can do so much more than any PC or laptop: it has a precise GPS chip; it is likely to have a 10-megapixel camera and a barcode scanner; it has 2G/3G/4G, Bluetooth and Wi-Fi; it has Near Field Communications (NFC) connectivity. It won’t be long before this technology leaves the pocket or sweaty palm to become wearable technology.

While there are a limited number of device platforms in the audience – Apple, Android, BlackBerry and Windows-based – each of these devices will have an almost unique personality. This is created by the personal selection of apps from a marketplace now providing in excess of one billion of them. Individuals have tapped into a vibrant, innovative, immediate and accessible software supply chain. Sixty per cent of the individuals who are less than 25 years old would probably readily admit that they are addicted to using the mobile device and it NEVER leaves their physical presence.

This is the reality of 2013. The mobile device is the primary computing device for most individuals and most enterprise workers. It is a computing platform that is beyond any ROI decision. It’s a reality of modern-day life and it’s only going to get more powerful, more prevalent, and more intelligent. Ignore it at your corporate peril. Jump on board and hang on.

So we need to urgently consider the breadth and depth of the presence of the mobile computing platform within the reality of the enterprise IT landscape, without becoming overwhelmed by the challenge. Mobility is not alone in its transformational impact upon enterprises. Mobility is actually one of four significant contemporary forces that an enterprise needs to embrace. Social networking, and information in the form of big data and analytics are the powerful forces alongside mobility that provide the central current pillars of the core IT platforms. Moreover the convergence, the interconnection, of social, mobile,
cloud and big-data technologies is changing how customers interact, how employees collaborate, and how companies provision and manage IT services.
Analysts at Gartner have christened this the “Nexus of forces” (Gartner: The Nexus of Forces: Social, Cloud, Mobile and Information. 1

Key Outcomes

Before exploring the rationale for why the mobile device is the new enterprise platform, we can declare the main achievements of what this exploration will lead to – providing the answer without the workings out, if you will.

- **The integration of mobile apps into the enterprise ecosystem is a must.** The mobile device is hosting an increasing amount of enterprise business logic; a mobile app is actually an intelligent proxy or agent for the enterprise systems, providing online and offline capabilities. While mobile apps are now plentiful and useful as standalone applications, the real power comes when the mobile app or mobile web is used to leverage data and business functionality in the enterprise.

- **Mobile is NOT just another access.** To consider mobile devices as simply mobile access or “just another channel” is to misjudge and undervalue a platform that is richer, more capable and more useful than simple servers or personal computers. This is due to the availability of location, the camera, the accelerometer, the feed into an overall context and an expanding list of other capabilities.

- **The combination of mobility with cloud, social and big data intensifies the effect.** The success of mobile apps has not grown alone as a single application stovepipe, but rather has been fed and accelerated by the intertwined nature of social networking applications, the feed into big-data environments with contextual mobile data, and an enriched mobile experience through the supporting services of the cloud.

So with this being the answer, how did we get to this conclusion?

As It Was – Enterprise Platform

To begin at the beginning, let’s consider the status quo in 2013 as regards the enterprise platform.

What is a platform?

**Enterprise Platform:** A set of computing and networking resources which enable installed Enterprise Software to exhibit the full attributes of an Enterprise System (most often referring to availability, scalability, and reliability) ²

The enterprise platform has grown up both in non-functional and functional terms to serve packaged and customer applications with services that enable the right balance of common platform services and functionality unique to the use case and hence the application. The stability over the past 15 years of this model is based on mostly server-side data and processes that are remotely accessed using internet technologies (via the browser). This has been a well-accepted and stable situation. The stability and universal acceptance of this model has allowed the enterprise platform to become more capable and has led to rich veins of software: enterprise software.

**Enterprise Software:** Software that solves an Enterprise Problem (rather than a departmental one) and that is written with an Enterprise Software Architecture and networking resources which enable installed Enterprise Software to exhibit the full attributes of an Enterprise System (most often referring to availability, scalability, and reliability) ²

We have at least two shifts in IT that are challenging this status quo: the cloud and mobility. Cloud computing has taken the evolution of the enterprise platform to the next level and looks to extend the common sharing of the platform between organisations and with it, a new business model.

The mobility challenge can be traced back to the early days of feature phones and BlackBerry enterprise services, but the real breakthrough came with Apple’s success with app stores and the new business model that accompanied this, combined with the increased access speeds of 3G.

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² [http://www.officevision.com/pub/p5ee/definitions.html](http://www.officevision.com/pub/p5ee/definitions.html)
Even from the early days, mobile devices have supported simple enterprise software services such as email and messaging. But given the pervasiveness of mobile devices and their always-connected nature, it’s a reality now that any current business functionality (and lots more beyond) can conceivably reside on a mobile device.

So while the current enterprise platform sits safely within the firewall, its procurement controlled by enterprise IT and its architecture derived to support mostly business-oriented applications, the mobile platform is quite a different entity.

If you are an IT professional steeped in years of enterprise computing, the mobile challenge may seem a solution to find fault with or an inevitability to delay the adoption of. For many others, however, not to embrace mobility as the enterprise platform is to go about with your eyes closed. The next generation of recruits now entering the workforce has a first instinct that the mobile platform is the computing platform and everything should at least be workable from there. This new preference for the mobile device is expressed in the phrase “mobile first”.

Technology Curve Balls

Businesses are operating in very turbulent times. Amongst the winds of change that can batter or power them (economic, social, regulatory, etc.), businesses’ ability to pick out the key technologies and use them to their advantage can be the difference between the failure (HMV, Nortel Networks) and success (Samsung, Asos, Apple).

Let’s consider some sample IT technologies that relate to mobility, which can cause a shift in a business’s operations and help to shape the nature of the next enterprise platforms.

IT Consumerisation

The desirability and the personal attachment of mobility devices is part of the wider trend of IT consumerisation. In the past, enterprises would be the first to get their hands on new technologies (calculators, PCs, the first mobile phones), but the direction has now reversed and the consumer is likely to have more advanced, more powerful and better connected devices. Many homes have Wi-Fi, HPNA networks, multiple computers, media servers and many phones of all descriptions; richer IT environments, perhaps, than the average business office.

This trend is lifting dramatically the expectations not only of customers, but also of enterprise users in the way they want to interact and work with IT systems. Some organisations have policies to allow personal devices inside the enterprise: Bring Your Own Device (BYOD). BYOD strategies require governance and
security policies to avoid unacceptable IT management costs or (worse still) security vulnerabilities. However, even when a business does not embrace BYOD, IT consumerisation has already shifted users’ expectations of how they expect to interact with IT. Indeed, it is often now the norm to provide IT services on the assumption that most people have a smartphone, rather than to implement the reverse situation of offering the least functional access based on what everyone has.

Disintermediation

For many of these IT strategies, there is both a positive and a negative spin. This is particularly true of disintermediation, depending on whether you are an executor or victim of it. Disintermediation is the removal of intermediates from the supply chain. Intermediates can be removed for two reasons: digital products are more easily consumed; and there are more efficient ways of delivering services without having people or organisations as proxies in the channel. The connected mobile device has created a new digital channel, allowing mobile e-commerce or self-service control of consumer services.

App stores are an efficient supply chain, allowing app functionality to be delivered to users’ devices so that even non-tech-savvy customers can obtain their own solutions from an open marketplace.

For the established enterprise, these new channels may disintermediate the products and services they once sold. The markets in which they previously had a majority customer share can now be tapped by competitors both large and small.

There is only one sure tactic: to be as transparent, open and appealing to your consumers and users as possible; to keep striving to be more online and more accessible so that others don’t disintermediate you.

Wearable Devices

This next IT strategy has not quite happened yet but we are on the cusp. In mid-2013, there are already 8,000 people trialling the Google Glass wearable device. Irrespective of the success or otherwise of the trial, it is certain that mobile devices will adopt forms other than the current, rather boring, hand-held form factor. Due to IT consumerisation they will either be in the enterprise as part of the way someone is working, or an inseparable aspect of the way that a consumer is trying to interact with a business.

So while this has not quite happened yet, there is an inevitability and a motivation for enterprises to be prepared for what it may mean, and there’s a sure sign that there are other innovations on the way. By having a mobility strategy, enterprises can harness and direct innovations to their own advantage. Failing to develop such a strategy could result in their demise.
Gamification

Gamification is an approach of using game thinking in the development of applications. While gamification as an approach is perhaps suffering from overhype, there are certainly lessons to learn from the concept.

Think about it: did you ever need to read the manual to play Paper Toss or Temple Run? No; it's obvious. If we can achieve anything like the simplicity and impulsive nature of games in enterprise applications, it could lift employee efficiency dramatically.

Mobile applications borrow many of the features of games: they are attractive to look at and they are intuitive to use. “Intuitive” means you click and you use straight away; this is not an era of training courses. This is also part of a movement of increasing human-centric applications rather than technocentric ones.

Another feature reused in the gamification of enterprise apps is rewarding the users as they progress through the app – this is then reinforced with leader boards. Enterprises can apply these techniques to incentivise and motivate the users to more effectively use the app and thereby increase their efficiency. As an example, an app developed in Cairo visually represents traffic build-up on one of the busiest road networks in EMEA. Users contribute to provide the traffic updates. These users are then ranked by their contributions and the users in the top ten are rewarded with loyalty points for retail outlets.

All Together

The common thread shared by these IT technology strategies is a rise in user expectations, be they consumers or employees. Providing form-based, grey-background applications to users (for which they need a training course) will soon not just be an irritation to the user but a serious handicap to the business.

The pace of change is also clearly increasing. Just a couple of years ago there was a buzz about being ready to provide services to “Generation Y” (those born in the 1980s and 1990s) and “millennials” (those reaching young adulthood around the year 2000). Two years on, and those young adults look like laggards compared to the experiences and expectations of the newly-turned-teenager. The technological impact on cultural and societal norms is causing finer discriminations in IT literacy. Expectations rise constantly.
What Does the New Enterprise Mobility Platform Do?

Incorporating the mobility enterprise platform into IT systems should give a new zest to the way users interact with applications. Let’s look at some of the aspects of how this will be different.

**New Personal Computing Ecosystem**

Surprisingly, after 30 years of history, most PCs have a very similar persona. A PC is likely to host an enterprise office set of tools, a browser, assorted (underused) utility programs and messaging/communication tools. This is not the case with the mobile device. From the genesis of tablets and smartphones there has been an open market for apps – with over a billion apps available today. So the user will use an enterprise app, together with many other apps they have chosen, to suit their social or working life. There are perhaps two implications of this: there are huge combined efficiencies in how these apps are used together (a positive benefit), but there is also competition for attention and usage to make sure the app continues to be used. Mobile app life can be very short – a replacement can be only a few clicks away.

Another aspect of this ecosystem is in getting your application designed and developed. There is a whole range of partners available – big and small – to help you keep development costs down and also to allow you to tap into innovative new app ideas.

**Personalisation**

The mobile device is a very personalised platform. It contains the user’s personal pictures and music choices; it’s connected into their social network; it has their unique combination of apps; and it is nearly always in their possession. To have your app upon this device is a privilege. That user is making a commitment and statement about your product and service by downloading your app. As the provider, you are then rewarded for this commitment by the user being reminded of your brand every time they look at and use the device. The user is likely to share information and contextual data with you that you can hopefully monetise to your mutual advantage.

**Device Capabilities**

The very least capability the mobile device provides is access. Always-on, always-connected is a very valuable capability for the enterprise platform, but the mobile device can do so much more. Thinking mobile in developing applications is about leveraging this rich platform of capabilities and not just considering it as a smaller viewing space for a Website.

In many field-engineer or operator situations, the device’s camera can bring a rich source of multimedia and context (see below) to the app. This can be used to make the user a provider of content which is
then shared with others – this could be either (business) social reasons or capturing field information e.g. a picture of a machine fault. The content can be analysed to provide context for the field and then information returned to the app to provide augmented reality.

The accelerometer in the device provides a means not only to render the app in the appropriate layout but also as an alternative data input. Rather than pressing the screen or keyboard, the user can shake the device to implement an action. This could be useful in critical environments or where a worker has to wear gloves, and hence the keyboard or screen press is not possible.

The device can use its Bluetooth or other localised connectivity to provide a Machine2Machine (M2M) gateway. The app could then be a control point for connecting other devices e.g. for medical apps connecting to bio-medical devices or for sports-performace monitoring.

Mobile apps have the opportunity to capitalise on the device’s rich capabilities, so that the user’s experience is more innovative, more personal and more connected into the user’s environment.

**Context**

Context is defined as the total sum of a consumer’s mobile experiences. This includes looking at the situational, attitudinal and preferential habits of mobile users³. In simple terms, this means the location of the user, who they are with, what they are near, what the temperature is, etc. The context is fed from the device capabilities (e.g. accelerometer) then enhanced by using the device local data with other sources (e.g. a user location database, maps or outputs from big data).

**Not Just a Widget, but Also a Connected App**

The power of the enterprise mobile platform doesn’t come from standalone apps. The app provides local business logic and a compelling UI, and importantly, it also provides the ability to control and access data from the enterprise back-end systems. A sales executive can use an app to see all the CRM data about a customer sitting in front of them. A field engineer can have access to all the schematics and instructional videos that were ever used to build the complex plant they are repairing, and can call on experts to help at the swipe of a screen. Integration is a vital ingredient in the successful enterprise mobile app. This is a specialised form of integration, as it must pass through the firewall and occurs over the air.

Mobility in a Nexus Context

To build a successful enterprise mobility platform, we need to be cognisant of the other fundamental technology forces that are prevalent today. Both Gartner and IDC have identified the importance of the interconnected nature of social, cloud, information (otherwise known as big data) and mobility. To build a mobility platform (indeed, a platform for any of the four forces) as a singular separate entity would be short-sighted and likely to result in an outdated architecture.

It is therefore wise to build the enterprise mobility platform in the context of an overall “nexus” strategy, and to put in place the integrations and implementation patterns for mobility to use and support the other three forces.

Mobility’s relationship to the other forces is shown in Figure 1.

![Figure 1: Mobility’s Relationship to the Other Nexus of Forces](image)

**Relationship to Big Data**

A mobile device is a raw supplier of data – it generates data due to its operation, its always-on connectivity and its physical movement. A mobile device is also a multiplier of data on the apps that run on it, since it provides context to those apps. The very fact that the device is literally always to hand means that it encourages people to use the apps and hence generate more data. The data is made more valuable because it is linked to an individual i.e. it’s personal – and this is very important in consumer relationships in particular.
The device usage data, network location, connectivity and billing data are available to the Communication Service Providers (CSPs). The CSPs in their mobility platforms are attempting to exploit this data themselves to personalise their offerings and also – regulations allowing – will expose this data via APIs for third parties to use. Examples include Telefonica’s “Smart Steps”. An enterprise may want to incorporate the data into its solutions, e.g. to have understanding of users’ mobile real-time connectivity or precise location (from micro-cells).

**Mobile as a Source of Data**

There are several categories of data from the mobile device. App data provides information on the usage and preferences associated with the app, e.g. how many times it is used, or photos taken within the app. There is data from the device, such as device configurations or information from the accelerometer. Moving server-side, there is information from the app store, e.g. downloads or feedback on the app. There is also a whole raft of data on the requests the app sends out to back-end services. On top of that, there is data on the connectivity and speed of the connection to the back-end services.

The variety of data that can be sourced from an enterprise mobility platform should perhaps be no surprise given that it's a powerful network computer built with an open-platform philosophy.

To allow a big-data platform to access and use this data there are multiple points in the enterprise mobility platform to provide access to data. This includes the app itself, the app container (e.g. MDM container) and the device (subject to device-vendor interfaces). Then on the server side, there are the content server, application server, integration infrastructure, policy controller and the app store.

**Mobile Apps Consuming Data**

The mobile app is also an obvious consumer of the output from the analysis of big data. The nature of big-data analysis is that there is no limit to what could be concluded, because more and more data sources are brought into the analysis. Examples include personalisation from sentiment analysis, content for big data (e.g. traffic-congestion analysis), augmented-reality feeds, recommendations (e.g. TV programmes) and reports on big data to provide visualisation.

**Relationship to Social**

Given that, at the time of writing, 70 per cent of most social network access is made on mobile devices, the interconnection of the mobility platform and social-networking applications is well established. It's perhaps a trickier question to understand the relationship between social networking and the enterprise mobility platform.

Enterprises do use public social networks to reach customers (by having an enterprise presence on Facebook, for example). Marketing staff within the organisation are likely to use mobile devices to both
monitor and contribute to social-networking conversations involving customers. So despite the fact that most public social-network apps will be present on employees’ devices for personal reasons, there is a justifiable business reason – at least for some employees – why the public social networking app should be part of the enterprise despite.

For employee and partner collaboration, many organisations are also adopting private social-networking platforms. This could be for allowing field engineers to communicate with job coordinators and fellow engineers. It could be for campus workers such as educators or health workers. Like the public equivalents, such private social-networking applications should have a mobile app – making it easier to use but also allowing content from the device to be uploaded (location, photos, videos, etc.).

**Relationship to Cloud**

Cloud computing and mobile apps provide mobility in two different ways. Apps provide mobility since they are always in the user’s personal possession. Cloud computing services provide mobility, since, by residing in the network, they are always accessible when connected. There is therefore a natural synergy between apps and cloud services.

As an obvious example, app stores and music libraries have been provided as cloud services since the inception of the smartphone. But this can be generalised so that all forms of data that serve an app should be provided on a cloud. For data-privacy regulations or security, a private cloud might be needed for certain data.

Many enterprises are seeing the benefits of using Software as a Service (SaaS) for certain classes of enterprise application. Apps provide the perfect means to access and use the SaaS because they can provide an easier-to-use UI instead of a browser-based web screen, and they also allow for offline working when there is no connectivity to reach the SaaS.

If the SaaS provides APIs, the mobile app can provide customisations while keeping the SaaS a standard service. This is the right balance of core “bought” functionality together with the “developed” functionality – the new mantra is “buy and extend” as an alternative to the restrictive “buy versus build”.

Given that a large organisation could have many thousands of devices using apps that call upon server-side services, and because app behaviour can be influenced by external inputs (e.g. a natural phenomenon), a TV show or a scheduled event (e.g. a stock price evaluation), there is a need for flexible resources in the server-side platform. A private-cloud IaaS (Infrastructure as a Service) or PaaS (Platform as a Service) can provide the perfect elasticity to underpin the mobile server-side enterprise platform. Since there are likely to be many apps that an enterprise develops, there are therefore many similar services needed, such as mobile security, app deployment, integration and content management. Whenever there are repeated services, it makes good business sense to make these available as PaaS.
PaaS provides common services in a self-service, easily consumed, managed and measured form that aids the rapid development of new apps.

Certain very large data sets (such as molecular models for pharmaceutical research) are naturally residing on cloud services because they permit sharing between organisations. There is then the opportunity to have apps that can visualise, explore and analyse the data. Indeed, mobile apps can be used as crowd-sourced data-processing engines.

The combination of cloud services (SaaS, PaaS and IaaS) and the portfolio of mobile apps could increasingly provide the complete functionality for an organisation such that there are no premises-based service-side services and we have in effect the “virtual enterprise”.

Enterprise Mobility Platform Architecture

The enterprise mobility platform is the vehicle for delivering the capabilities and strategies outlined in this paper. While pursuing the new opportunities that mobility brings, it is necessary to build upon fundamental IT capabilities (such as integration and security). This is a real boost to the enterprise IT team, because while there are new skills, concepts and technologies specific to mobile, many of the existing skills and techniques are still vital for success. A functional view of an Enterprise Mobility Platform is shown in Figure 2.
The first thing to note is that the platform does not just exist within the enterprise firewall. The device is part of the platform and so too are the public-cloud platform and services. Many of the existing techniques are used in extracting functions and data from the packaged applications e.g. SOA services and development of business processes. However, in the interface between the device and the enterprise services, new techniques are required.

Operating over an air interface requires more optimised messaging techniques and different protocols to provide true real-time interactivity in the app.

Security concerns are heightened since there needs to be a controlled relationship of users and access rights both on the device and then in how the apps interact with enterprise services. At the same time, for cost and operational reasons, most enterprises will not want a secondary bolt-on security regime, but rather something that works with the single-sign-on and central security policies already in place for the existing enterprise.

Deploying the app to the device, managing its operation and keeping it up to date are new challenges for the enterprise. As a result, the enterprise mobility platform needs to incorporate Mobile Device Management (MDM) and provide a private app store, and also work with the app store and services provided by the device vendor.

There are different techniques for achieving the app functionality. It might be a native app – built specifically to run on one device and operating system. At the other extreme (and providing cross-device accessibility) it could be a mobilised Website. Hence the platform will include web experience management that can deliver adaptive design techniques to render the content to match the device capabilities. The other option is hybrid applications that use technologies such as HTML5, JavaScript and Cascading Style Sheets (CSS) or embedded common operating systems that allow an app to be written once and deployed on many device types.

To support the different app approaches, there needs to be a set of development tools that allow for the design, coding, simulation and customisation.

And Finally, Help is at Hand

Hopefully this paper has either confirmed your understanding or alerted you to the new opportunities of embracing mobility in your enterprise. Oracle is very keen to help you in exploring your mobility thinking –
in the context of social, cloud and big data, or as a specific topic in its own right. Oracle is able to work with you to define your strategy, develop architecture, initiate your first project or put an enterprise mobility platform in place. Please contact your Oracle sales representative.