

Mobilising enterprise applications

Whitepaper

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Contents

THE CHALLENGE	3
What are the issues with mobilising enterprise applications?	3
Who has this pain?	4
How many are affected by this problem?.....	5
Why not just build mobile apps?	6
How do companies overcome these challenges?	6
THE SOLUTION.....	7
Major (traditional) vendors.....	7
Enterprise Mobility Management (EMM) vendors - now renamed as Unified Endpoint Management- UEM	8
Mobile App Development Platform (MADP) vendors	8
Mobile App Developers (MAD)	9
VDI vendors	10
Enterprise Applications Mobility Layer (EnAML) vendors.....	10

THE CHALLENGE

What are the issues with mobilising enterprise applications?

1. The range of enterprise applications in use within an organisation. Below are just some of the main application types:
 - a) Enterprise Resource Planning (ERP)
 - b) Customer Relationship Management (CRM)
 - c) Human Resources Management (HRM)
 - d) Supply Chain Management (SCM)
 - e) Enterprise Asset Management (EAM)
 - f) Computerised Maintenance Management System (CMMS)
 - g) Field Service Management (FSM)
 - h) Manufacturing Resource Planning (MRPII)
 - i) Strategic Service Management (SSM)
 - j) Business Intelligence (BI)

2. Each one of these could have originated from a different vendor, been bought at a different point of development, i.e. Built using the technology of the day, be at a different level of upgrade, i.e. Not all on the latest and greatest release etc. Etc.

3. The critical nature of the applications
 - a) Most, if not all, of the above, are in constant use within an organisation, and they can ill afford to take this offline for any significant periods without causing major disruption to the business.

 - b) The data contained within these systems are "critical business assets" which need to be safeguarded against loss or theft and, typically, significant effort is put into ensuring that these systems are secure from external infiltration for this very reason.

 - c) With the recent advent of GDPR, there is now another financial reason for organisations being ultra-conscious of the need to secure these systems viz. The hefty fines issued by the ICO for data breaches.

4. The time, effort and cost involved in ensuring that the enterprise systems run as desired within the business.

- a) A significant proportion of the applications in use within a large-scale business will have either been modified to suit a specific use case for the company or been changed through the addition of third-party add-ons providing some specific process not covered by the core system.
 - b) Even with "vanilla" versions of these applications the implementation is a complex project often taking many months, if not years, before being fully completed
5. The ill-defined "need" for mobile use of these applications
- a) The requirement for accessing these systems, while mobile has been primarily driven by users rather than from some internal desire to mobilise the workforce with the result that there has often been an ill-defined definition *"I just want it on my iPad!", "Why can't I use my smartphone to do what I need done?"*
 - b) There are increasing cases of companies spending significant amounts of money to implement mobile applications in response to these user demands which after launch are subject to meagre user adoption rates with comments such as *"do I have to learn a completely new interface to do what I can do in moments on my laptop?", "Why can't I just do what I usually do on my desktop, but a tablet?", "I've already got too many icons on my desktop, why do I need even more?"*

Who has this pain?

1. The issues highlighted affect many levels within an organisation such as:
- a) Users- these are typically not consulted on the plans for the organisation to change systems but are expected to adapt to new methods of working, sometimes with relevant training but often without.
 - b) A typical response might be *"I'm just too busy to have to relearn this stuff!"*
 - c) Developers- assuming that there is an in-house development resource they are already busy supporting code which either they, or worse, someone else wrote and which may require them to learn a new language or become familiar with a new toolkit etc. So, although they respond well to the challenge of getting involved with mobile app development, they often do not have the bandwidth to achieve this on top of their existing workload, so end up supporting even more code which they didn't write!
 - d) Finance - they are already conscious of the significant financial investment (often running into hundreds of thousands, if not millions) already made in these

enterprise systems and are typically resentful that even more money needs to be poured into these IT projects to provide a "nice to have" mobile app created.

- e) As a result, they are often a significant block in gaining approval for new investments into mobile apps.
- f) Security- with all the efforts needed to stay ahead of the attacks from hostile attempts to infiltrate the mission-critical systems within the business, the last thing which the security team wishes to cope with is the added dimension of trying to secure business assets on mobile devices. Especially given the number of instances of loss or theft of these devices, leading to potential loss of business secret data. Their ideal environment would be to have no data moving out of the tight internal controls they have in place and no data downloaded to devices which might be lost or stolen!
- g) IT - faced with a growing demand from users for mobile access to these enterprise systems, the IT department is not typically staffed with enough expertise in mobile technologies to determine themselves whether a proposed mobile app development will have a significant impact upon their delivery of end-user support services. So here again, there is a tendency to put this in the "too difficult" or "not just yet" box and to only grudgingly support this initiative if instructed to do so.
- h) Senior Executives - frequently the originators of the demand for mobile access, this group are focused not on the minutiae of how to go mobile but on the projected business benefits of deploying a truly mobile workforce with all of the benefits such as reduced real estate costs, increased working hours, improved efficiency, higher customer satisfaction etc. Etc. Unfortunately, they typically have a short attention span, so it is difficult to get them to spend time on ensuring that the mobilisation process is working - i.e. They're only interested in the outcome, not the journey.

How many are affected by this problem?

There are estimated to be 7,000 companies in the UK with more than 250 employees. Even assuming a low estimate of 10% undertaking digital transformation, this gives 700 companies grappling with this problem now.

Why not just build mobile apps?

The vast majority of companies seeking to create mobile solutions struggle with two tricky challenges:

- a) Over time software has become more complex as vendors have attempted to add new features, many of which are not used by a typical user, but are perceived to be necessary in case they wish to do so - how many of you, for example, need to use the Bibliography or Table of Authorities options in Microsoft Word?

This growth in complexity has been achieved in most instances by increasing the size of the installation base necessary to support the application – Word, for example, needs a minimum of 3Gb of drive space just to install it and at least 2Gb of RAM in order to run it and Excel and Outlook are similar - rapidly eating up storage and CPU.

If you look, not at a desktop system, but an enterprise system such as SAP, then this increases dramatically - to install all the main applications of SAP would need 230GB of hard drive space just for the software and at least 20Gb of RAM to operate.

- b) Whilst mobile devices have also dramatically increased in configuration - note the change in under 10 years of the iPad from its original version with 64Gb of storage and 256Mb of RAM to the recently released iPad Pro 2018 version with 1TB of storage and 6Gb of RAM – they are never going to replace the configuration of the servers running the company's enterprise applications.

How do companies overcome these challenges?

The vast majority of companies seeking to create mobile solutions have adopted one or other of 2 strategies to address these insoluble challenges:

- a) They develop apps which run directly on the mobile device, but which, as a result, must have minimal functionality to minimise their installation size and RAM requirements. This results in a plethora of "point-specific" apps being developed - typically based around specific roles, e.g. Sales order clerk, etc. And are only a tiny part of the overall functionality of the underlying enterprise application.

This route leads to "icon overload" with each point specific app needing to be individually found, managed, updated, etc. To give some idea of the scale involved, recent studies were done by Gartner in the US claim that the average large company would need 2,000 mobile apps to be developed to supply the same functionality as their installed enterprise systems.

b) They develop a web-enabled (or Software as a service-SaaS) approach to deliver browser-based access via the Internet to the underlying applications. This approach suffers from several significant issues, including:

- "Web-enabled isn't mobile" - this is a quote from SAP!
- The user experience of trying to use a Windows browser interface on a mobile device is abysmal,
- Typically, a browser interface occupies a lot of precious screen real estate with items which are of little use to a mobile user (scroll bars, icon toolbars etc.) And prevent a full-screen view being presented on the mobile device.

This approach (and the earlier point specific one) also suffer from potential "data leakage" issues as they may well allow users to download or print off data, which would otherwise be secure within the corporate firewall, thus exposing the company to potential data loss.

2Go™ uses neither of these approaches delivering full screen, full functional access to the underlying enterprise applications including any customisations and/or third-party add-ons installed. This enables users to fully utilise their knowledge of the underlying applications without being restricted to specific tasks while keeping full data security, as no data is transferred from the company's servers to the mobile device.

THE SOLUTION

There are many ways to address the delivery of content onto mobile devices, and some examples of these are:

Major (traditional) vendors

Vendor/Brand	Concerns
Microsoft – Xamarin	Performance issues
Salesforce - SF1	Hidden costs
Progress – Kendo	Responsive design not good
SAP- Fiori	" Web-enabled is not the same as mobile."
IBM – MobileFirst	Latest version completely different from earlier with no roadmap
Oracle	Problems with internal changes
Red Hat	None
Embarcadero – AppMethod	None

A typical approach is to develop "point specific" apps which deal with only one task at a time, e.g. Order entry. If a user needs other areas of the underlying application (e.g. Look up customer order history) this may or may not have been included within the original app. If not, then the user will need another app developed to enable this access etc.

Enterprise Mobility Management (EMM) vendors - now renamed as Unified Endpoint Management- UEM

Vendor/Brand	Concerns
VMware - Workspace ONE	Competitive pressure from Microsoft
Microsoft	Does not support legacy Android apps
IBM - MaaS360	SaaS only
Blackberry	Container based
MobileIron	Lacks integrated client management
Citrix - Citrix Endpoint Management	Complex license structure
Sophos	Few large deployments
42 Gears	The product license structure is complex
SOTI - SOTI One	Growing pains
iVanti	Limited take-up
ManageEngine - Desktop Central	Lacks admin features
NationSky - NQSky	Very specific to China market
Snow	Outdated look and feel
Matrix42	Does not support Office365

These vendors are typically focused on trying to control "the stable door" i.e. Their solutions are more about controlling the device itself- remote wiping, automatic shutdown etc. - Rather than what can be achieved with the device and are typically good candidates for potential partnerships with 2Go™ as, although clients do not need UEM to secure content on their mobile devices using 2Go™, we do co-exist happily with such solutions as Workspace ONE and MobileIron etc.

Mobile App Development Platform (MADP) vendors

Vendor/Brand	Concerns
OutSystems	Crashes a lot!
Mendix	None reported
Kony- KM P	Poor quality control on upgrades
Alpha Software -Alpha Anywhere	None reported
MobileFrame - MobileFrame Business Suite	None reported

DSI	Poor support
GeneXus	Heavily dependent upon the code
i-exceed – Appzillon	Depends on CSS
Pegasystems	None reported
Red Hat	None reported
ApiOmat	Errors in the software
Appian	Low code, not no code
Axway – Appcelerator	None reported
Neptune Software- Planet 9	Low code, not no code
Betty Blocks	None reported
Resco	None reported

These vendors are attempting to get clients to use their frameworks to develop mobile apps (again these tend to be developed as a point-specific apps) but have the added disadvantage that, as they are independent of the underlying application vendor, their approach is usually "start all over again and do it our way!" This results in users having to deal with completely different interfaces to complete tasks with which they are familiar and leads quickly to a lack of user adoption.

Mobile App Developers (MAD)

Far too many to list, but costs range from <\$25p/h to >\$200 p/h.

A report by Kinvey in the US has estimated that, by the time a developer has completed the following components (all necessary for a stand-alone mobile app), this will take on average 18 weeks to complete:

1. Data storage
2. User Management
3. Server-side logic
4. Data integration
5. Push notifications
6. Versioning
7. Caching
8. Synchronisation
9. Wireframing
10. UI design
11. UI development
12. UI polish

Given the average of 18 weeks to develop a single app, this requires a budget ranging from \$18,000 to \$144,000 per app! (18 weeks* 5 days* 8 hours)

When you bring back the Gartner finding of needing 2,000 apps to replicate your in-house systems, this results in a development budget requirement of somewhere between \$36m and £288m!

VDI vendors

Parallels Remote	Microsoft RDS
Citrix XenDesktop	VMware Horizon View
Redhat Enterprise Virtualization	NComputing Workspace
Userful	Systancia AppliDis Fusion
Oracle VDI	Nvidia Grid
Dizzion	DellEMC vWorkspace
Cisco VXi	Sangfor aDesk

These vendors all tend to take a similar browser-based display approach with the resulting poor performance and lack of user productivity, which has been experienced by those who have tried to use this approach on mobile devices.

Enterprise Applications Mobility Layer (EnAML) vendors

This approach, which is entirely different to most of those listed above, entails not trying to turn the mobile device into a replacement for a server, let alone a datacentre, and instead uses the mobile device as a client device within a traditional client/server configuration to provide the mobile capability.

Using the client/server configuration enables a separation between the processing power required to operate the installed enterprise applications – typically provided by servers with high specifications far beyond those of even the most powerful mobile devices – and the interactivity required to allow the user to work effectively on their mobile device

While a simple client/server structure could provide the ability for users to access their enterprise applications remotely – this is typically how the VDI vendors above operate – there are several inherent problems with such a straightforward approach.

Amongst these are:

- a) Communications between the client and the server need to be secured to prevent data loss through hacking actions
- b) Simple clients do not typically prevent users from being able to extract data from the remote applications through either saving locally to their device or through local print
- c) Simple clients do not usually provide any user productivity enhancements to enable users to work more effectively while remote from their office
- d) Inability to varying the demands on bandwidth because of tuning resolution settings

2Go, built to the EnAML Standard, overcomes these problems through the creation of native client apps developed for iOS and Android devices which handle all the interactions between the user and the streamed information being delivered to the device from the dedicated server used to connect to the source applications.

With all communication between the client device and the 2Go server being secured through encryption to Federal Information Processing Standard (FIPS) 140-2 and with an architecture which does not call for the movement of any data from the application server(s) to the client device, nor allows for the user to either store data locally or to access local devices such as printers or removal storage (e.g. USB devices), the use of 2Go does provide a full data secure system which satisfies even the most critical of security requirements.

Even before any user interaction can take place, there are some new processes to secure Information, including the fact that each mobile device must be confirmed before use by a specific user. This cloud-based validation record details of the device – not the user – and can be withdrawn in moments to prevent access, must enable the user to connect through to a specified 2Go server location.

The 2Go server software has been explicitly designed to provide four main facilities:

- a) The encryption/decryption mechanism to secure communications between the server and remote client devices
- b) To deliver the user authentication controls to the client device and then to pass the encrypted user authentication data, once decrypted, to the designated authentication server for approval, receiving a success token in exchange
- c) To initiate and control the interaction of the relevant user with the specified enterprise application as a proxy for the actual user
- d) To provide a means to update the remote display with only the appropriate pixels needed to redraw the existing display

Rather than rely upon a browser-based display with all the screen real estate overhead involved, 2Go deploys a responsive, novel user interface supporting navigation with icons and thumbnails but still provides the ability to view the remote applications in full-screen mode.

User efficiency enhancements which are also provided within the 2Go app include:

- a) Custom user-definable gestures which can be “mapped” to workflows or functions within the underlying application
- b) Specialised on-screen keyboards which provide Control and Function keys and/or alternative language configurations. This facility could be used, for example, to define keyboards which allow for on-screen large size limited number of keys which could be used by emergency service personnel wearing gloves.
- c) Voice recognition-based data capture and control capabilities to extend enterprise applications which were not developed with voice capabilities in mind.

Designed from the outset to be capable of delivering a multi-tenant, multi-server, multi-application, multi-user, multi-session facility, the 2Go system enables users to work with a wide variety of methods, both “vanilla” and custom, from a variety of vendors without the need to develop any mobile apps.

Capable of being implemented within days and to scale to serve thousands of users, 2Go is a cost-effective solution to the problem of how to mobilise existing enterprise application.

If you like to validate 2Go with a demo and think we may be able to help you stay ahead, please don't hesitate to contact us. We will be happy to answer your questions and discuss your needs in confidence.

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