

The background of the slide is a photograph of a person's hands and arms working at a wooden desk. The person is holding a black smartphone in their left hand and a tablet in their right hand. A laptop is open on the desk to the right. The image is partially covered by a large magenta overlay on the right side.

Introduction to Mobile Working

Part 2: Devices, Networks
and Technical Considerations



Foreword

This eBook follows on from **Introduction of Mobile Working Part 1: Benefits, Barriers and Initial Considerations** to provide a technical introduction to mobile working and highlights key considerations for those embarking on a mobile transformation project within their organisation.

This introduction touches on device selection and network before recommending some further considerations around user adoption for a mobile transformation project. The information in the eBook has been collated by NDL based on a decade of experience in mobile working with a variety of public sector clients. Examples of success stories from NHS Trusts and Local Governments have been included alongside NDL's recommendations.

Even for the smallest team, the benefits and return on investment offered by proper business mobile working can be huge. This is based on NDL's experience with customers who have used MX, NDL's mobile working toolkit, to deliver hundreds of apps to tens of thousands of workers in a variety of team sizes/organisations.

Savings on field worker time of up to 25% are regularly seen. In addition to the time and motion savings, the improvement in data accuracy delivers the ability to plan

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Mobile devices and network

At one level, developing and deploying a mobile working solution is very simple: it's connecting your audience/teams with information, delivering it to them and receiving it back. However, there is a lot of work to be done to enable a process to be properly digitised. In today's world, with a huge variety of devices and networks to choose from, it can be hard to find the right one for your specific mobile working objectives. The wrong choice can impact on the success of your organisation's projects, so you should consider:

- The best device to be used by the team in the field
- Network access and coverage in the area
- User adoption and co-design of the process you are digitalising



Device Selection

Mobile devices come in all shapes and sizes. The three main players in the market, Apple, Android and Windows, all make a variety of models to cater for the huge consumer demand. These range from Smart Phones all the way through to fully-functional tablet PCs or notebooks. Each has their own strengths and weaknesses and despite their many differences, there are several things they all have in common.

It's important that a device is appropriate for the jobs/processes it will be used for. Those designed for PIM, (Personal Information Management) such as email and calendar, may not be appropriate for a business process mobile app. These devices may be small and portable, but this may mean they are not big enough for the teams to work on effectively in the field.

If staff do not have a say in device selection they may end up with a device they do not like, which can make them reluctant to use it. This will have an impact on the ultimate success of a project so field testing different devices with your users is recommended.

Size and Weight

It is important to consider how appropriate the size and weight of the device is for the intended use/period of use. For example, if the device is heavy and needs to be held for a long period of time there may be a RSI-type risk. It is also worth considering the addition of accessories such as wrist straps, cases, holsters etc.

Personal Apps and Information

If users can also use their work device for personal purposes, they may download personal or social media apps - possibly compromising the organisation's control over what is stored on their devices and potentially the security of the device itself, creating threats to confidential organisational data. It is recommended that the organisation educates its staff on what behaviour is expected when using one of its devices.

Accessories

Accessories which are likely to be essential to support the business process with the device of choice should also be considered. This includes; headsets, power cables/packs and USB cables, in-cab holsters and rugged cases - everything to ensure that the work force can effectively carry out their tasks.

Hardware

The intended business process of the app will determine which hardware features need to rank highly on your list of priorities. For example, if an app requires a lot of text input needing keyboard visibility or if handling images, plans and drawings, a larger screen would be recommended. Also, if the intended business process involves photography it is important to consider the camera quality and internal storage capacity. The same principle can be applied to various other features, such as battery life, keyboard style, screen resolution and device durability.

Supply Longevity

Device and operating system life cycle, supply chain and servicing should also be considered. Long procurement processes are not advised when buying devices as models change so fast and by the time the process is complete, a new model is released.

If a device goes un-serviceable in the field, how can a user be rapidly supplied with a new device in the shortest time? The price of a replacement device will probably be far less than the lost productivity. It's also important to consider how any residual data will be automatically removed from a lost or stolen device as well as how a device might be tracked.

Network Support

Traditionally, there are three main types of network support offered by a device:

- Through the phone - GPRS, Edge, 3G and 4G networks (see the section below)
- Bluetooth networking - mainly important for peripheral support rather than serious data networking
- Wifi networking - wireless Ethernet (usually IP-based). Useful to keep data charges down and deliver far faster performance than phone-based networking

Device Summary

Devices' battery life, storage capacity, processor power, screens and peripherals are all developing at an unbelievably fast rate as competition intensifies between the providers for market share. It's important to look beyond the bells and whistles heavily promoted by mobile phone sales staff and focus on basic user need. Having real end-users spending time testing devices in the field is essential to ensure a successful deployment.

MX, NDL's mobile app development toolkit, works on and supports any mobile device, allowing you to easily deploy the same app to different devices to meet different user needs, without the need for redevelopment. This means you will always have a choice.

The Network



Network Access

Wireless and data networking for mobile devices has come a long way since NDL was providing products for analogue mobile phone circuits 25 years ago. There is a huge choice of network type and service provider available. The most common methods of accessing a corporate network are via a Virtual Private Network (VPN), APN or possibly via corporate wifi hotspots. As with phone calls, it can still sometimes be very difficult to get a signal. Besides, voice signal coverage does not always guarantee access to mobile data.

Despite the claims of the network providers, no network coverage is truly UK-wide, and different network types offer different speeds in different places. Bandwidth is shared across areas, so as more devices become involved, connections inevitably get slower, affecting download and transfer speeds and hugely impacting mobile workers operating in the field. N.B. Network licences are granted by UK government based on coverage for a percentage of the population, not geography.

NDL recommends that all apps should be able to run independently on the mobile device as well as when connected to a central server, and that they should be tolerant of poor networks. Functionality available in offline mode vastly improves staff and business efficiency as well as ROI. Operating in and out of signal, MX, NDL's mobile working toolkit takes the information captured and automatically updates your systems.

Network Types

To give an overview, below are the main types of network available, their different speeds and the basis on which they are offered:

GPRS: up to 171 kbps

Sometimes seen on devices when in poor coverage areas or outside the UK and the one the main UK mobile data networks supported first. Used mainly for texting, email and other apps. As far as coverage is concerned, this network practically overlaps with the voice network, sometimes allowing transmission of data when a voice signal is not available.

EDGE: up to 384 kbps

Enhancement technology for GPRS, roughly tripling its speed. This network is aimed at anyone who needs a more data-rich environment for web-surfing. This is, in reality, just a compressed GPRS signal.

3G: up to 3.75 mbps

Sometimes referred to as mobile broadband and promising high-speed mobile data, this network was originally viewed as technology for high-demand users, especially for laptops and video calls. It is now seen as second tier and its appearance on the phone screen is usually the precursor to signal dropping all together.

4G: up to 100 mbps

4G has widely replaced 3G as the main mobile network, offering higher peak bit rates, wider channel frequencies and greater capacity for data transfers. It also changed the network standard to compete with a wired or wifi data network using TCP/IP rather than the packet switching system base used by the previous generations listed above.

Wireless LAN: up to 1000 mb

This service is a good option for those with large data needs who can wait between synchronisations. Cafes, hotels, bars and other locations commonly offer their own WIFI hotspots and many cities have public networks. Organisations can also subscribe to specialist networks, either on a basis that is independent of mobile voice/data packages, or as a 'bolt on' through an arrangement with a service provider. Once connected to a hotspot, there are few restrictions on bandwidth usage, allowing for bulk data transfers - an improvement on other options that feature data-consumption based tariffs.

Next generation 5G:

Currently in development. This network will again offer a greater bandwidth, speed and coverage range than its predecessor, 4G - along with the potential for lowering battery consumption. However, this is still several years away and will usually require handset replacement that supports the new 5G communications chip sets.

Charges

Data connectivity is a major money-maker for mobile phone service providers and charges vary greatly. Huge over-run data bills can often be generated by unwary users, and it is imperative that the chosen contract takes account of this. However, most providers do offer increasingly reasonably priced data-based tariffs, with bundles ranging from hundreds of megabytes to several gigabytes per month. NDL strongly advises anyone looking at mobile working apps to carefully examine how data usage and data growth could affect their costs. With the speed at which the market is moving, contracts that tie into a single service provider and tariff for a long period should perhaps be avoided. Mobile apps created using NDL's development tool MX support all the different networking standards discussed here.

Network Summary

For successful mobile working, a robust service with expanded 4/5G coverage is required. This will help to assure organisations that their services can rely on mobile technology to support all day-to-day operations and processes. Device capability for online and offline modes is still a 'must', so that data can be synced with the back-office later if connectivity is not immediately achievable. Networks will only continue to get better as coverage expands and newer technologies like 5G are deployed.

MX also adds network resilience, in case signal is lost part way through a process and provides strong encryption for data both on the device and while in transit.



User Adoption of Mobile Solutions

Co-Design of Mobile Working

An area often overlooked by those running 'IT' projects, but one that is critical to the success of a mobile working solution, is that of user adoption. A huge variety of mobile devices can now cater for every need, though as a result, choosing a device and providing mobile working apps that users are happy with and are willing to use can be tricky. Co-design is full end-user engagement in the design and development of mobile working apps and it is a vital element in the uptake and adoption of the mobile working.





App Development and co-design

Co-design

Co-designing is the process of involving all stakeholders in the design and production process to ensure the outcome suits the needs of the user. An app built using this method is more likely to have a higher end-user uptake.

NDL assisted in the development of an app using this collaborative approach, co-designing the app with the users themselves, giving them the opportunity to explain what was practical and what was not. As NDL's MX is a rapid, drag and drop development environment, an agile approach was taken, with iterative, rapid development 'build it', 'try it', 'refine it' techniques used throughout.

The end-users were also involved in the device choice, trialling several different setups in the field before deciding which they

Look and Feel

Mobile working apps often re-render the legacy system(s) with the introduction of a 'touch' rather than mouse and keyboard driven interface. Clear well-spaced layouts, good font sizes and intuitive icons are best.

Its important to consider changing an app's layout options to allow it to work well across different devices, taking into account the screen's orientation, resolution and size.

Text Input

The ability to work with rich text - text you can edit in terms of typographical formatting and other kinds of enhancement - can also be very difficult on devices with small screens and with on screen keyboards. Apps should be designed with this in mind, including elements like phrase libraries and reusable text templates to reduce narrative typing.

Working Context

The type of work and processes the app will be used for will have a major influence on its design, for example; plans, diagrams and large text input boxes are easier to see and edit in a landscape orientation.

Working location should also be kept in mind during development. If the app is to be used in the field, it is always wise to ensure all elements are still visible in sunlight.

Relevant Information

While a member of the team working in the field does not need access to every bit of every back-office system that they may have when on a PC in an office, they do need the right information to be delivered from all relevant sources in an accessible format, from wherever they are. Simply reproducing all the details on those systems used in the back-office may not be suitable, as these are usually more feature and information-rich to allow for multiple kinds of use. Analysis shows that office-based users only use a fraction of the screens and data available across a back-office system on a day to day basis, as they deliver their role and tasks. Recreating the whole back office on a mobile screen app will not work on devices with smaller screens and potentially slower network speeds. 'Lean' principles need applying to the design of mobile working apps, focussing only on those elements that will deliver core value to the user and the organisation as part of a specific process.





Mobile app integration

There is no doubt that gathering data in the field brings huge advantages in terms of accuracy, speed of response and efficiency. The full benefit of this can only be realised with the ability to integrate mobile working apps directly with the multiple back-office legacy systems. Retaining information in a new data source that does not link and then entering it by hand at a later date, as with paper, seriously de-values the mobile working app and the benefits to the organisation.

Apps used in the field should draw on existing data sources and update them automatically. Also, as they often provide richer information to the back-office than was possible previously with a paper-based system the benefits are multiplied as the organisation now has timely and accurate data with which to plan.

For example, one app NDL has developed allows information from multiple back-office systems to be taken in real time and transposed and integrated into a purpose-built mobile app for multi-skilled tradesmen. The workers can get specific job information collated with specialised updates. Afterwards, all back-office systems can be remotely updated, along with accounts, stores and even third-party components suppliers. The app can run offline, so there is not a dependence on network connections to stay updated. Suddenly not only have paper forms been made obsolete, but the amount of supportive administration involving the rekeying of information into as many as seven different systems is eliminated.

There are a range of methods available to achieve total integration. These include:

Direct to Database

It is possible to write data directly into a back-office database. You will need access to this database and this can be a risky approach as it is fairly simple to make an error which would seriously compromise the whole database. Where a back-office system has been developed 'in-house' and the organisation maintains the system, then this works well. Third party vendors quite rightly prevent this given the risk to the overall system. They can however provide a safe interface into the data as part of their API set. MX supports all the common database types so where this is available, connection of mobile to back-office is simple.

Web Services

It is also possible to use web service connections and vendors often provide these as part of their range of API's, however these may be already complex systems that could complicate the integration. In 2018 NDL introduced a graphical web services interface for MX that reduces the need for this

APIs

An API (Application Programming Interfaces) is a specifically-engineered connector which allows you to submit data directly into a back-office system without the risk of compromising it. They are generally good for high-volume work but these can be costly. – [Please refer to NDL's API Buyers Guide.](#)

NDL SX

SX, NDL's Robotic Process Automation toolkit, is an access tool and connector solution for back-office apps, especially those with no interfaces for the data needed or where API costs are prohibitive. This technology uses a common, safe, non-invasive approach for all back-office systems, whatever their type. A simple-to-use workbench ensures you can develop and publish a brand-new interface or web service for an existing system in hours rather than weeks for the lowest possible overheads.

NDL MX

The MX mobile working toolkit supports a comprehensive list of integration methods, so the choice of any individual or mix of approaches rests with you. This means you can always read and write data to your current and future back-office systems and that MX can grow with your business.

MX supports the concurrent running of multiple apps across numerous devices. It integrates with multiple back-office systems, allows users to simply and safely access apps and provides full usage-audit across users, groups and devices. It also secures data in transit and data stored on the device, with both online and offline mode. Best of all there is no need to be a specialist software developer to use it as it has a drag and drop, low code environment and is backed by a library of pre-built apps that can be customised to your needs, getting you rapid results.

For more information on SX or MX contact info@ndl.co.uk or to book a demo, visit www.ndl.co.uk/demo



Conclusion

Mobile working technologies and apps extend business existing systems' reach into the field by enabling processes to be digitised and reducing the replication of unnecessary administrative processes. They significantly improve productivity, corporate agility and customer responsiveness while lowering business costs. Choosing the right platform and investing in proper planning is essential. The key is having a mobile working platform and vendor that offers a proven way of integrating with the existing infrastructure.

This eBook has introduced the positive aspects surrounding the adoption of mobile working technologies and the considerations that need to be made when selecting devices and networks, so that others can benefit from NDL's extensive experience in this sphere.

MX from NDL puts you in control of your mobile working. You can take information from different back-office business systems and turn this into a series of mobile working apps which accurately mirror the processes your field teams are performing. Operating in and out of signal, MX takes the information captured and automatically updates your systems. It's so simple to use; with the intuitive toolkit, you can design and make unique business mobile working apps from your organisation and run them on any device type you choose. There's also a full suite of management and security features to make sure your information is protected.

It takes just days to create a highly effective mobile working app that integrates all the features and platforms your teams need. NDL also provides an [App Showcase](#) containing a large variety of templates, designed by users, each of which is free to download and customise. All of this is available in one unique product.

Read the MX case studies online at www.ndl.co.uk/casestudies to see how NDL's mobile working toolkit, MX, has helped organisations like yours to deliver successful mobile working solutions, increase efficiencies and save money. It's easy to do yourself without specialist developers to get results quickly.

If you haven't already, download [Introduction to Mobile Working Part 1: Benefits, Barriers and Initial Considerations](#) to get a more general overview of mobile working before you embark on your mobile transformation project.

For more information or to book a demo, contact
info@ndl.co.uk

To read full case studies, visit
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