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PAPER, PAPER EVERYWHERE?

The Ultimate Guide to Mobile Data Collection and Eliminating Paper Forms

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A Mobile Workforce:
Driving the Need for Mobile Data Collection

The skyrocketing adoption of mobile devices is not just affecting the consumer. Sure, the latest and greatest smartphones such as the iPhone and Android-based devices are flying off the shelves, but the mainstreaming of mobile technology is also leading to an increasingly mobile workforce – around the world, California to Cameroon. In fact, IDC predicts that by 2015, over 35 percent of the global work-force – more than one billion workers – will be considered mobile. To further under-score mobility's ubiquity, research firm eMarketer expects that 4.55 billion people worldwide will use mobile phones by the end of 2014, and by 2017, mobile phone penetration is predicted to increase to 69.4 percent of the global population.

The mobile workforce spans almost any job type, in any industry and in any location – from sales to field service to facilities managers, global healthcare workers and construction – whether in North America or the developing world; the list is endless. Some of these mobile workers need complex applications that pull from multiple back-end systems and involve complex business logic. But the reality is that the majority of field workers need easy-to-use, intuitive applications

that make real-time mobile data collec-tion and collaboration between the field and the home office or home organization simple.

In today's technology age, it is easy to assume that most organizations, regardless of size or geography, have made the leap from paper forms to mobile data collection through on-device apps. But the truth is a majority of mobile workers performing
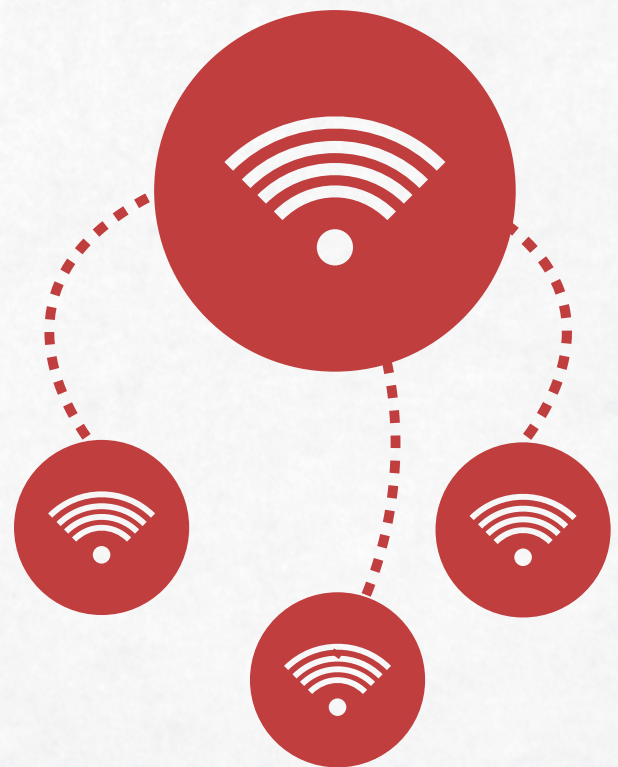
surveys, inspections, information verification, etc., and the organizations that employ them are still relying on paper.

The result is information delays, data inaccuracy and a lack of collaboration, which come with their own set of negative business impacts on a company, government agency or non-government organization. The good news is that technology exists to rapidly turn paper-based forms into mobile data collection applications and deploy those apps to any device – all without technical expertise or expensive ongoing management.

A better understanding of mobile data collection and its benefits, its wide range of applications, and best practices can help improve adoption rates of the practice and increase understanding that its uses are as wide ranging as the human imagination.

What is Mobile Data Collection?

Mobile data collection involves using mobile phones – even basic phones – or tablets to gather data in the field. Using simple apps running on the devices, users can quickly and easily gather information wherever work or volunteering may call them.

Most often, data is collected via a form that's created either on the web and deployed on each mobile device, or an app that's downloaded on each device. The mobile app follows a similar flow to the paper form. It may contain a list of questions or checkboxes, either open-ended or multiple choice, and leads users in a logical, step-by-step ordered process that ensures all necessary information is collected and communicated.

For more than two decades, organizations have been exploring how to use mobile devices, starting with PDAs, to easily gather survey and other information in remote areas, even those with no cell service or Internet connectivity, as well as city centers. Initially, there were concerns about the costs and training needed for the technology, particularly in developing countries, but the basic devices have proven to be inexpensive and easy-to-use, and users have quickly adopted them.

Mobile data collection enables organizations of all sizes to put technology to work, replacing outdated paper-based processes and improving productivity. Just a handful of uses include large-scale data collections such as censuses, voter polling, inspections and consumer interviews, among many, many others.

Benefits of Mobile Data Collection

If something is currently collected on a paper form, it can be replaced – in minutes – using mobile data collection. A simple mobile form application running on a cell phone, smartphone or tablet can allow anyone to collect data anywhere across the globe. From tracking vaccinations in remote villages to responding to natural disasters to ensuring that oil and gas pipelines meet regulatory compliance standards, mobile data collection can happen anytime, anywhere.

The benefits of mobile data collection in the field include:

•Removing "Paper" from Paperwork
Mobile data collection replaces outdated paper-based processes, enabling organizations to reduce their environmental footprints. With a simple form-based app running on a mobile device, users can collect the same information in dramatically shorter time while replacing countless paper forms. No more printing and photocopying, no more transporting boxes of forms from location to location, and no delay in information communication.

•Improved Data Integrity
Copying information from paper forms to computer programs for posterity and analysis introduces the opportunity for data transcription errors. With mobile data collection, answers are entered directly into the device and relayed to a database or other means of export. This greatly reduces the risk of transcription errors or the potential for lost forms while exponentially improving data integrity. Mobile also provides automatic skip patterns based on answers selected in previous questions, as well as the ability to insert numeric ranges that validate information.
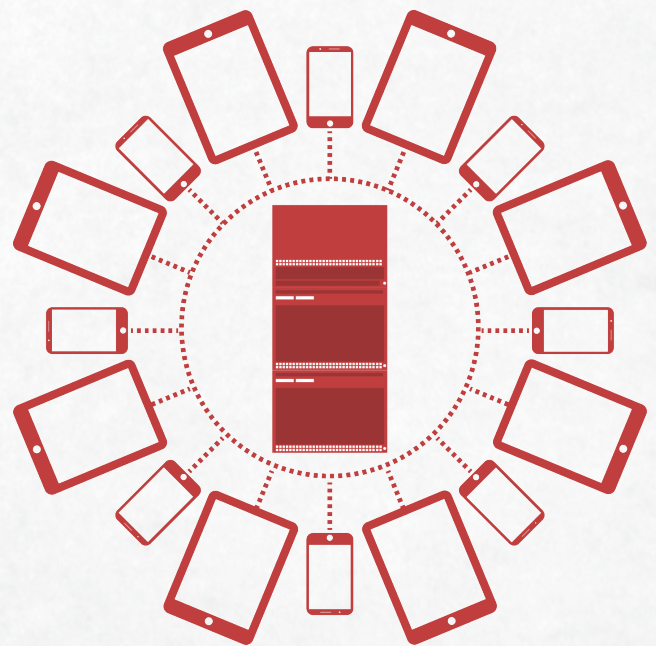
•Faster Access to Data
With paper-based forms, there is a delay between the data being collected and the data becoming actionable. In some cases, this can be days, weeks or even months. These delays can be critical for time-sensitive applications like inspections or research. Collecting data on mobile devices enables users to transfer data online or store it to local servers, enabling real-time access to information for immediate analysis.

•Collecting Geo-Data and Mapping
Mobile data collection enables users to go off the beaten path while collecting geo-data such as GPS coordinates. This rich data helps create a complete picture of an area through more accurate maps and visualizations.

•Improved Inventory / Shipment Insight
Whether it's medical supplies for remote villages in the developing world or packaged goods traveling to a fulfillment warehouse, mobile data collection improves insight on inventory and shipments, empowering manufacturers and shippers to track goods throughout the entire supply chain. Users can enter and upload order information from any mobile device to give real-time access to vital data.

Who Can Use Mobile Data Collection?

Gathering information with mobile devices is beneficial anywhere paper forms are in use – from doctors' offices to construction sites to industrial inspections. And for a number of workers today, their jobs don't happen in an office – they're out in the field, collecting data that impacts lives and initiatives, whether that's information related to world health, the environment, geo-political happenings or conditions at mines, pipelines, drilling rigs or construction sites.

Mobile data collection uniquely enables these workers to gather data on multiple devices from city centers or remote corners of the globe – wherever the workday takes them.

•**Data Collection for the Greater Good**
For more than 20 years, mobile data collection has impacted the lives of thousands of citizens around the world. From the largest health initiative to information on education in remote communities, mobile devices have enabled inexpensive, far-reaching data collection of critical information.

Thousands of field workers and volunteers from some of the world's largest NGOs

and nonprofit organizations such as the World Health Organization, the United Nations and the Red Cross use mobile devices, including the most basic cell phones, to gather information on birth and death rates, childhood vaccinations, human rights campaigns and many other vital world initiatives.

A local Ministry of Public Health & Sanitation in Africa, working with a large global organization, manages twice-yearly child health campaigns to ensure childhood vaccination, along with provision of other vital health interventions. Since 2008, they have monitored the campaigns, from drug supplies to parental satisfaction, with a low-cost mobile app deployed on a mobile phone. This electronic means of monitoring campaign activity has meant a dramatically improved ability to ensure that each child in the country receives the healthcare he or she needs. The Ministry also uses mobile data collection for many

other purposes, including tracking out-breaks and measuring vaccine coverage.

•Mining for Good Data

Regulations require that energy equip-ment, including transformers, pipelines, drilling rigs and more, are inspected and meet compliance standards. With mobile data collection technology, energy field workers can perform their job duties such as break-fix, work management and com-pliance audits via a mobile device, saving organizations time and money. Anyone, regardless of technical expertise, can use mobile applications that help turn time-consuming paper-based operations into simple, intuitive mobile processes in real-time, from anywhere on Earth.

An energy company in Australia was able to replace its paper-based data collection process with iPads to capture production data from its gas fields. Operators take about 30 different readings daily, including casing pressure, instantaneous gas flow rate, pump speed, water flow rate, down-hole pressure, leaks at surface, volume drained from separators and more.

•Building Better Data Collection

Whether at the latest industrial site or a remote development, construction re-quires a variety of forms, from inspections to punch lists to permits. Mobile devices enable construction teams to eliminate that onsite paperwork and tedious data entry back in the office and replace it with easy-to-deploy mobile form-based apps. Data can be collected in real-time on any mobile device, from employee-owned smartphones to company-owned tablets.

•Research Around the World

Not all research takes place in a controlled lab environment. Collecting data in the field, even in the furthest reaches of the globe, is a snap with mobile devices in-stead of paper-based processes. Mobile phones, smartphones and tablets all go where the researchers go, making mobile data collection simple and fast. Data is directly entered into the devices in real-time, making it instantly available for analysis for critical research.

The public health school at a South Ameri-can university adopted mobile data collection to provide one of the most ad-vanced m-Health education and research programs in the region. Students deploy electronic forms to conduct research, investigations and statistical sampling.

Best Practices in Mobile Data Collection

Transitioning from paper to mobile data collection or implementing a new process driven by mobile devices requires careful foresight. While the technology is easy to use, users can get overwhelmed or side-step important stages in the process without proper planning.

•Planning
Before setting out to collect any type of data, create a strategy. Outline the objectives for the project. Is it to inspect energy equipment? Track students' attendance? Track inventory and shipments? Involve all stakeholders in the process to ensure that the tools and frequency of data collection are adequate, as well as determine the budget for the project.

The planning process should also include evaluating available software and hardware. Will low-feature mobile phones, smartphones or tablets be best for gathering data? Will the hardware have adequate battery life and data storage for collection? What languages does the device support? These are questions to weigh during the planning process.

•Choosing an Application
There are a number of options on the market for creating mobile data collection forms, each with a broad range of features and pricing. The latter will play a key role for many organizations, as budget is a large consideration. "Freemium" (where the basic service is free to users), pay-as-you-go and subscription are some of payment options available.

Features such as skip logic, data presentation and online custom form creation can dramatically impact the success of a mobile form. Specialized features such as outgoing batch messaging, which is available with certain select vendors, enhances mobile data collection by enabling reminders to data collectors, messages to beneficiaries, emergency notifications and other mass SMS or audio communications.

Other key considerations include intuitiveness and ease of use – how quickly and easily can non-technical users create a new form. Also critical is whether the organization's devices run the application's supported platforms. Consider how well the application will integrate into current workflows – does it have an API that will allow for easy data flow into existing system software?

Finally, a mobile data collection app's reliability is key factor. The industry has experienced a great deal of growth in recent years, and several vendors have come and gone in that time. A solution with longevity – some have been around for more than a decade – delivers stable software with robust features for a variety of industries.

•Designing Forms and Surveys

Form design directly impacts the quality of the data collected and the usability of the survey itself. Plan out the survey questions on paper first to ensure that there are no duplicate questions and skip logic is clear.

However, keep in mind that mobile forms and paper forms are NOT direct translations of one another. For example, collecting data via SMS only allows users to enter 160 characters at a time, so keep that in mind when writing questions. Try to limit open-ended questions, as multiple choice questions are both faster to enter and easier to analyze.

•Training Staff

Regardless of how familiar data collectors are with the technology they are using, they will require training. This includes learning the ins and outs of the mobile device, such as powering it on and off, charging it, accessing the form, entering data and downloading data at the end of the day. Training should involve going through the forms with sample respond-ents and mimicking the conditions in the field as closely as possible such as Internet connectivity or lack thereof. Allow at least five days for adequate training.

•Field Testing the Forms

Test, test and then re-test the form in field conditions before collecting real data. This not only ensures that the form asks the proper questions, it also helps the team anticipate any issues and is critical for the success of mobile data collection. For at least two days, mimic the conditions in which users will be collecting data to help determine if the mobile devices can retain enough battery charge and have enough memory for the project. Have collectors submit data from the field to determine if there are any issues with sending or receiving data. And don't for-get to develop a back-up plan: what to do if the battery dies or the device is lost.

•Collecting Data

Once the training and field testing is

done, real data collection begins. The first step in the process is to remove any test data from the mobile devices and the online database to ensure that everything in the system as you move forward is real-world data. Also make sure that the most recent version of the survey has been downloaded to each mobile device. This is critical if any changes were made during field testing (try to use a system that automatically updates the forms on each device, as this will save a lot of work). Keep in touch with data collectors to ensure that they are reaching respondents and everything is going well in the field.

•Uploading and Exporting Data

When data collectors upload their data, which should happen at pre-determined times throughout the data collection process, check for data quality and completeness. Mobile data collection greatly improves data quality and the speed at which data is available to stakeholders, but if the data isn't being entered correctly, it's benefiting no one. Check all of the equipment at the end of the collection process to ensure that all of the data has been uploaded from the device to the server, as well as to guarantee a complete data sample.

Once uploaded to the central application, data can be exported to a number of programs, depending on the mobile form solution. Some solutions feature an API that enables direct integration with popular programs like Salesforce.com and Excel, which allows for continuous, real-time data analysis.

•Data Visualization & Analysis

After upload and export, data is available for advanced analysis and visualization in a variety of tools, depending on the particular mobile form solution. If the solution allows for collecting rich data such as geo-data, users can create maps in addition to the tables and graphs that traditional data produce.

Broadcast Messaging Keeps Your Audience Informed

In addition to creating forms to collect data, some mobile form apps have a valuable additional feature – outbound messaging. With SMS and audio messaging, users can set up broadcast messaging via a web interface in any language, far less expensively than with traditional mobile device messaging.

Messaging can play a critical role in data collection projects, helping with coordination; serving as reminders and notifications to improve workflow; and communicating results with project managers. Workers in the field can also be advised of a change to the survey or be reminded to submit their data.

Make a Positive Impact with Mobile Data Collection

As mobile technology becomes more pervasive in the workforce and the global community, it is enabling a revolution in how business is done. Replacing paper-based forms with mobile technology provides a number of benefits across various industries – real-time data collection, dramatic time savings and improved data quality, while reducing environmental impact.

To ensure project success, there are a number of important things to keep in mind when you create forms or collect data in the field. Observing these will dramatically increase mobile data collection project success:

•**Test the Form**
Always test the form thoroughly before going to the field.

•**Test the Hardware**
Always test the form on the same type of phone or tablet that the respondents will use. Longer forms require more memory, which means a more expensive device; a $30 basic phone may be incapable of collecting data with a 500-question survey.

•**Allow Adequate Time to Train Your Team**
Experts recommend five full days for training, including practice data collection in the field followed by classroom reviews. Two hours of training is probably not adequate. Data collectors usually need several hours of practice in the field with the final form before they start the actual data collection.

•**Plan for Connectivity Problems**
Even if users are planning to upload data directly from the field, poor network connections might make this impossible. Make sure the field staff knows what to do if they cannot upload data (for example, they can bring the mobile device to the office at the end of the activity). Make sure they understand that the data will be safely stored on the device for as long as necessary.