



# Nokia Data Gathering

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Executive  
Summary  
(November 2011)

## **Abstract**

*Organizations engaged in fundamentally different activities share the same need for accurate and timely field data. Filling out paper forms, sending them back and transcribing them is a slow and cumbersome process that delays information availability and potentially crucial decisions.*

*Data collection with a mobile phone has the potential to dramatically improve any service that relies on accurate and up-to-date information. The more time-critical the information, and the more remote the location, the more organizations have to gain from a mobile phone based solution.*

*Nokia Data Gathering is a solution that helps organizations to collect field data on critical issues using mobile phones instead of paper forms, PDAs or laptops. Whether helping to prevent disease outbreaks, building a census or tracking agricultural stock levels, Nokia Data Gathering has saved time and money for organizations around the world while also improving information accuracy.*

## **Data gathering with mobile devices**

Organizations engaged in fundamentally different activities share the same need for accurate and timely field data. Whether it is about efforts to monitor and fight outbreaks of malaria and dengue, track the stock levels of agricultural produce, improve people's access to water or conserve endangered species a significant amount of data need to be collected, analyzed and acted upon.

### **Benefits of mobile data gathering**

The use of mobile phones for data gathering is proliferating around the world. Especially in the emerging markets where availability and accuracy of data can be poor mobile data gathering has proved to solve many challenges with delays, costs and inaccuracy.

**Speed.** The primary benefit of mobile data gathering solutions is the speed at which information can be gathering from the field and analyzed. Mobile phones have the ability to transmit and time-critical data quickly; when ever within the coverage area of a mobile network.

By contrast, paper forms are usually collected and transported to a separate office location for manual data entry by another member of the organization. Transportation is rarely seamless, particularly in more remote areas. Delays often occur before and during

transportation as well as afterwards, when the information awaits manual entry to the IT system.

**Data accuracy:** With data collected on mobile phones, the information only needs to be entered once removing the need for interpretation of hand-written data and potential mistyping of information when transferring information from paper to a computer system.

**Reduced cost:** The cost efficiency of a mobile based data gathering solution comes through many sources: reduced transportation, removal of duplication of work and error correction to mention few. There is also a cost of inaction – as time passes the decision-making environment changes and can result in organizations having to take a less favorable course of action. In the case of a disease outbreak or crop infestation, for example, delays can lead to significant human as well as financial costs.

**Reduced environmental impact:** Mobile data gathering minimizes the frequency and need for heavy load transportation and carrying papers in and out - especially at remote locations.

**Usability:** Mobile phones as a data collection tools offer convenience through their usability (mobile phone can easily be used while standing or on the move), size (easy to carry and keep safe), weight and battery longevity (especially important in the regions with lack of electricity). They offer also additional possibilities for example GPS location data and imaging. Additionally, since mobile phones can send data from many remote locations, collected data can be transmitted in near real-time for analysis.

| Alternatives  | Benefits  | Disadvantages   |
|---------------|---|---|
| Mobile phones | <ul style="list-style-type: none"> <li>● <b>Fastest data transfer from remote locations</b></li> <li>● GPS location data for each response</li> <li>● Greater data accuracy and security</li> <li>● No duplicated work</li> <li>● Lower transportation costs</li> <li>● Suitable for mobile use (standing/on-the-move)</li> <li>● Long battery life</li> <li>● Light, easy to carry</li> <li>● Easier to protect from theft and the weather</li> <li>● Need to invest only in one device</li> </ul> | <ul style="list-style-type: none"> <li>● Up-front investment</li> <li>● Technical training required</li> </ul>  |
| Laptops       | <ul style="list-style-type: none"> <li>● Faster data transfer than paper forms</li> <li>● No duplicated work</li> <li>● Improved data security</li> <li>● Portable</li> </ul>   | <ul style="list-style-type: none"> <li>● Slower data transfer than mobile phones</li> <li>● Up-front investment</li> <li>● Heavy</li> <li>● Short battery life</li> <li>● Ill-suited to mobile use (standing/on-the-move)</li> <li>● Requires personnel to carry multiple devices</li> <li>● Difficult to protect from theft and the elements</li> <li>● Technical training required</li> </ul> |
| Paper forms   | <ul style="list-style-type: none"> <li>● Low up-front investment</li> <li>● Easy questionnaire creation</li> <li>● Easy to use</li> </ul>   | <ul style="list-style-type: none"> <li>● Slow</li> <li>● Transcription errors</li> <li>● Duplicated data entry</li> <li>● Transportation costs</li> <li>● Higher operating costs</li> <li>● Lack of data security</li> <li>● Risk of total data loss</li> </ul>   |

*Figure 1: Comparison of different data collection methods*

## Nokia Data Gathering history

Nokia Data Gathering program was born in early 2007 in response to inquiries from public, private and non-governmental organizations about the development of technological solutions which could be used on a global scale and which focused on the rapid and accurate collection of data from field research. This data could then be used by an organization for analysis and decision making.

After initial research the Community Involvement team at Nokia Institute of Technology in Manaus developed Nokia Data Gathering, a mobile system to improve the efficiency and accuracy of data collection in the field. The first project on Nokia Data Gathering was implemented in the Amazonas together with Amazonas State Health Department (SUSAM) and the Health Vigilance Foundation to fight back dengue fever.

Since the first project, Nokia Data Gathering has been implemented around the world in different sectors. Since August 2010 the software has been offered as open source version to allow many more organizations to use it and modify it for their own specific needs.

## Nokia Data Gathering solution overview

Nokia Data Gathering is a solution that helps organizations to collect field data on critical issues using mobile phones instead of paper forms, PDAs or laptops. Since mobile phones can send data from many remote locations, collected data can be transmitted in near real-time for analysis.

Nokia Data Gathering consists of two modules, server and mobile phone, to enable smooth information transfer from the survey administrators to the field workforce and vice versa.

**Server:** The Server Module is used to create and send surveys to mobile phones, receive interview results, administer users, devices, questionnaires and responses, map data using GPS-based data, and export data. The server can receive interview results in near real-time, provided the field personnel are within range of a mobile voice or mobile data network. Additionally, the server can be connected to a GSM modem to send messages and receive responses from the mobile phones of the field personnel.



Figure 2: Example screens from Nokia Data Gathering server

**Mobile Phone application:** The Mobile Phone Module is the only part of the system that is visible to the field personnel. It is the software that appears on their mobile phone, presented as an easy-to-fill questionnaire.



Figure 3: Examples of Nokia Data Gathering mobile phone application

The process with Nokia Data Gathering begins with survey creation, which enables the production of tailored questionnaires. The questionnaires can then be delivered to the field workforce wirelessly using a normal mobile telecommunications network. Having received the questionnaire(s) on their mobile phones, the field workforce can then use their phones to enter and store the responses to questions. The system also allows to geo-tag data with GPS location information, providing an additional layer of information and helping to validate data. Once the information is collected, solution enables them to send responses back for instant analysis, again via a mobile network.



*Figure 4: Nokia Data Gathering process*

Compared to other mobile based data collection tools, Nokia Data Gathering offers high usability (easy to use Java-based client), complete end-to-end system (including mobile and server modules allowing organizations to host their own server and have security in the knowledge that the data collected by them will remain in-house) and ability to map the results.

### **Nokia Data Gathering projects**

Since 2007 Nokia Data Gathering has been implemented around the world to help to prevent disease outbreaks, building a mobile birth registration, tracking agricultural stock levels and more. When time is of the essence, it doesn't matter whether it is a public service or commercial operation; fast, accurate information is important for sound decision-making in every organization.

Find more projects online from: <https://projects.developer.nokia.com/ndg/wiki/projects>

## **Fighting back dengue fever in the Amazonas - Amazonas State Health Department and Health Vigilance Foundation**

Every year hundreds of people die of dengue fever in Brazil. The disease is transmitted through mosquito bites and outbreaks spread quickly with devastating effects. Amazonas State Health Department (SUSAM) and the Health Vigilance Foundation (FVS) leverage Nokia Data Gathering to help fight the spread of this disease and increase the effectiveness of treatment.

During 2008, 3522 cases of the dengue were registered in Manaus. With the help of Nokia Data Gathering, during 2009 the number of cases was reduced dramatically to 245. That is 93% cut in the number of the cases! Nokia Data Gathering helped the health workers to do their jobs. It cut the steps in the process, made the process faster, and more accurate.

“The Secretaria de Saúde do Amazonas has a series of programs dealing with endemic diseases in the region, and Nokia’s technology will help us to more rapidly identify and investigate the results and symptoms of the surveyed population. The transmission of immediately after the interviews improves agility, increases public safety and avoids manual filling-in of forms which is usually a difficult and time-consuming process”. Aginaldo Costa, State Health Secretary of Amazonas State.

## **Improving the care for sponsored children in Indonesia – World Vision Indonesia**

Collecting information from tens of thousands of sponsored children on a regular basis is very labor and cost-intensive, yet crucial for both the donors and children themselves. With accurate and up-to-date information, immediate issues that might keep the children from being safe, healthy and going to school can be addressed quickly. Timely and accurate reports also lead to increased quality of service towards the donors, thus encouraging further funding.

Nokia Data Gathering will simplify the data collection process and reduce manual steps. This will lead to up to 48% savings on the time spent on and reduce operational costs of the data collection by 39%. Savings derived can potentially sponsor more than 16,000 children when Nokia Data Gathering is fully deployed across Indonesia. Efficiency improvement on data collection allows more efforts and time to be spent on activities that have direct and positive impact on the children.

"I'm excited with the new tool and perceive Nokia Data Gathering as a positive program that can speed up the process of taking the child's data at field level (Child Management Standard) and shorten the admin work in ADP (Area Development Program) office." – World Vision Indonesia Field Officer in Pontianak, West Kalimantan, Indonesia.

## **Following up the crop production in the Philippines – Department of the Agriculture and WWF**

Getting timely, relevant and error-free data from the field to the regional and central offices plays a crucial role in following up the crop production and ensuring sufficient levels of stock.

Department of Agriculture together with WWF have started tracking stock levels and market prices of agricultural produce using Nokia Data Gathering. Additionally damages caused by El Nino and other natural disasters are being monitored. Nokia Data Gathering has substantially shortened the cycle for requested field information enabling faster and more accurate decisions benefitting the agriculture producers nationwide.

"The Nokia Data Gathering solution will augment and eventually replace our data-gathering systems so we can concentrate on crafting programs and solutions to further boost farm yields despite the erratic weather patterns." Bernie Fondevilla, The Department of Agriculture Secretary.

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Further reading:

Please visit <https://projects.developer.nokia.com/ndg>