Advancing CAPI/CAWI technology with

Survey Solutions

Survey
Solutions

Advancing CAPI technology with Survey Solutions

Survey Solutions is a free CAPI software developed by the World Bank which offers a cost-effective, sustainable solution for conducting complex, large-scale surveys.

The software combines rich data capture functionality on tablets with powerful tools for survey management and data aggregation, reducing the time lag between data collection and data analysis, dramatically improving data quality, and reducing survey costs. The ability to supplement household survey data with GPS coordinates, sensor data, time stamps, photographs and more opens up new and greater possibilities of tackling innovative, policy-relevant questions.

Survey Solutions also collects massive amounts of auxiliary data (known as paradata) on the interview process, such as time spent on each question, changes in interview assignments, and verification logs. This paradata can improve data quality by introducing Responsive Survey Design and Adaptive Survey Design techniques. To date, Survey Solutions has proved itself to be a robust instrument for data collection in more than 140+ countries in all regions of the world, successfully coping with challenges of deployment often in harsh conditions and on tight schedules.

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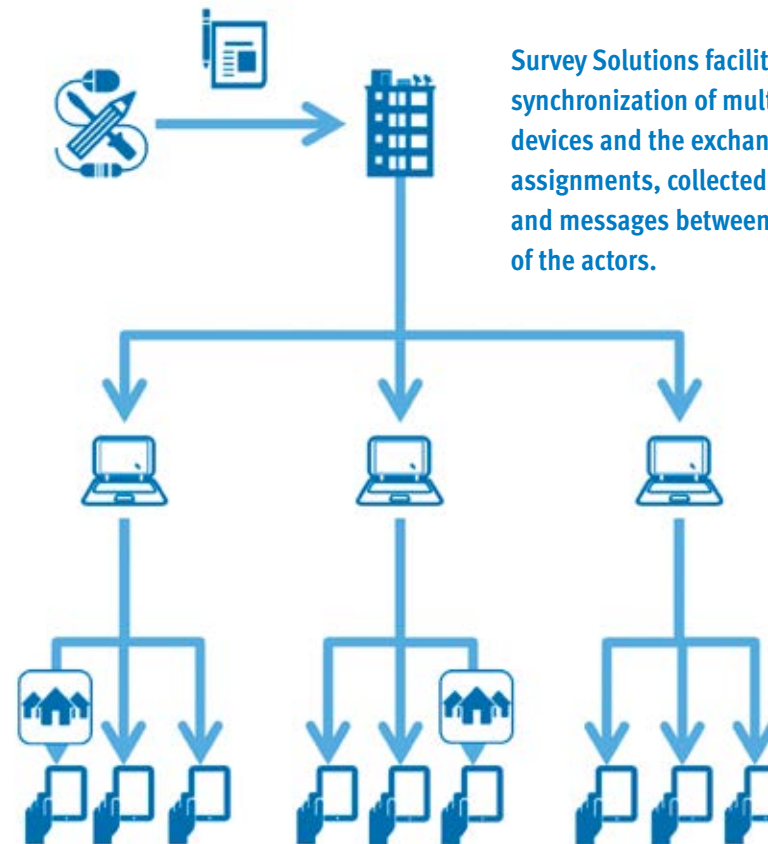
Survey Solutions is a system of multiple interacting software components. Each component facilitates the work of a particular actor: an interviewer, supervisor, survey administrator, and others. The multiple components are combined together in a hierarchical structure depicted here. At the top of the hierarchy there is a headquarter user that can start a new survey, specify the list of addresses to be visited, validate and export the data, build and analyze reports and perform other survey administration tasks.

Headquarter user imports the questionnaire from the designer component, which is a global networked tool for development of questionnaires for Survey Solutions.

The supervisors manage their respective teams of interviewers, distribute the assignments, and perform quality control of the incoming information.

The interviewers follow the assignments received from their respective supervisors to collect the information from the respondents in sampled households.

The Survey Solutions system facilitates synchronization of these multiple devices and exchanges the assignments, collected data as well as informational messages between all of the actors.
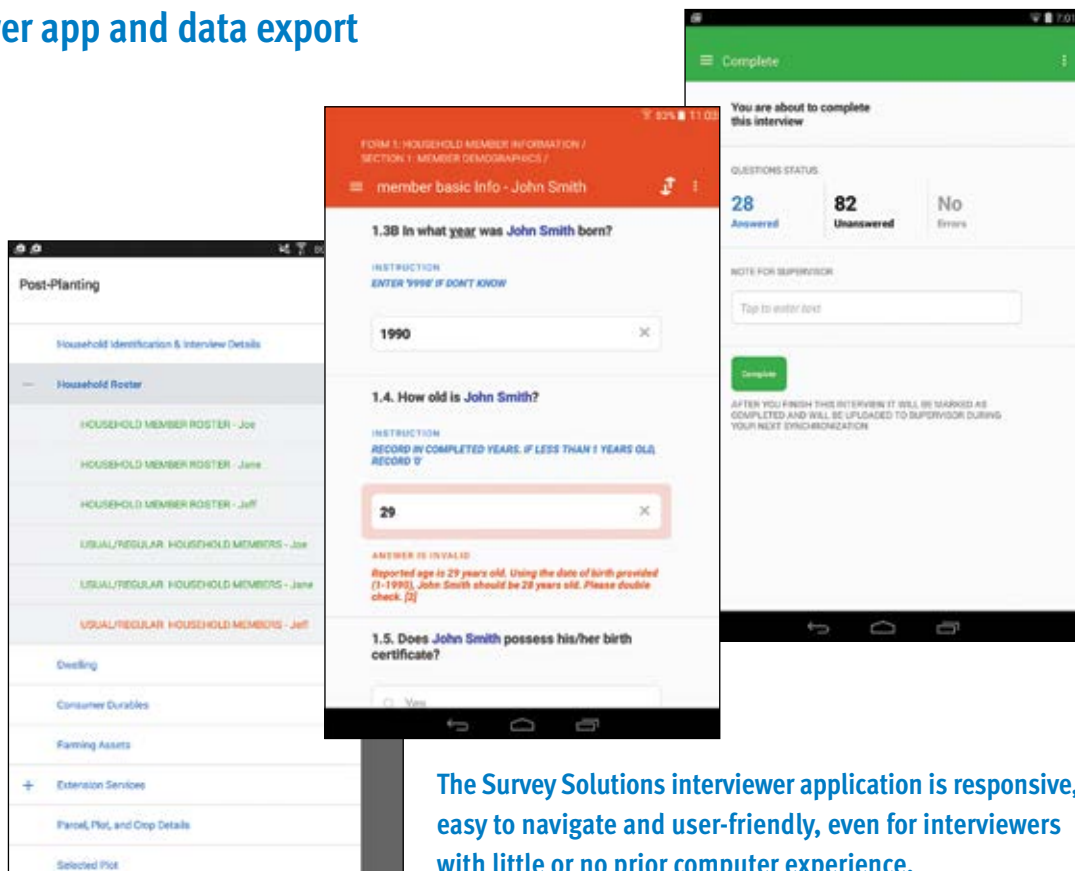

Survey Solutions facilitates synchronization of multiple devices and the exchange of assignments, collected data, and messages between all of the actors.

User-friendly interviewer app and data export

The Survey Solutions interviewer application is responsive, easy to navigate and user-friendly, even for interviewers with little or no prior computer experience.

Data prefill and automatic creation of interview assignments simplifies the process of data collection for large surveys, and particularly for panel surveys.

Users of Survey Solutions appreciate the convenience of an open data export format, compatible with any major statistical package, spreadsheet or database application. Direct export to Stata,™ SPSS,™and other binary formats simplifies the analysis of collected data. Export of meta data to DDI format facilitates integration with data repositories and collections.
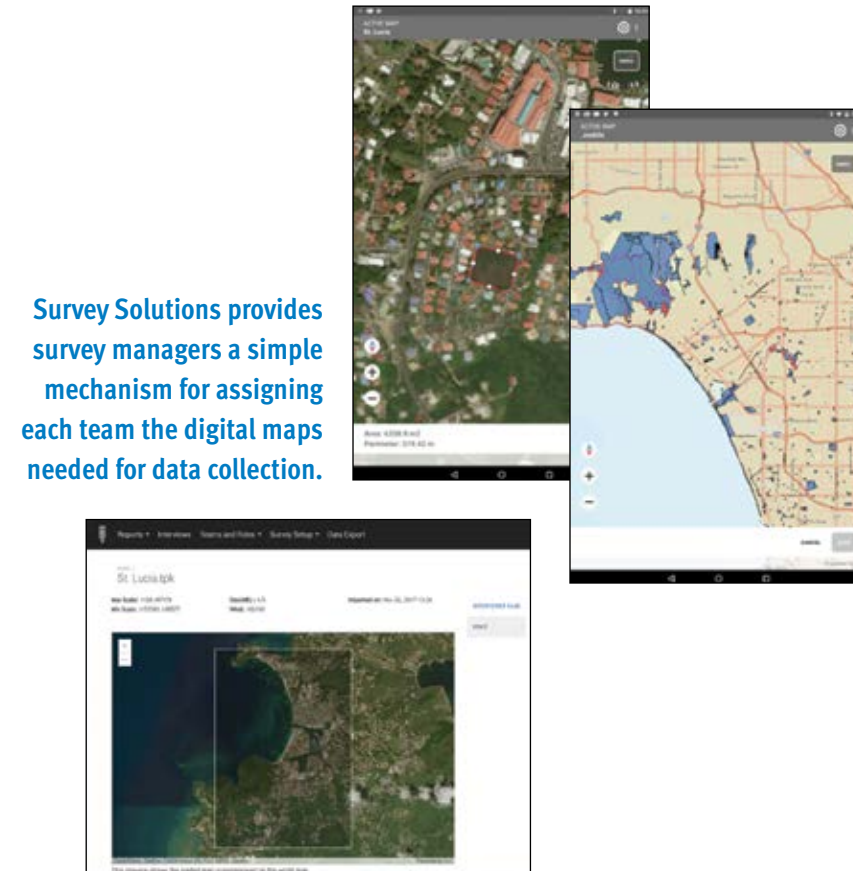
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Powerful offline GIS functionality

Survey Solutions brings the power of GIS tools to surveys through a partnership with ESRI, a world leader in GIS software.

Up until now, surveys have captured GIS information through unreliable self-reports and costly direct measurement (e.g., asking household members the distance from the dwelling to the nearest well, walking the perimeter of an agricultural plot, etc.). Now, Survey Solutions offers tools for adding precision to survey measures of GIS information. With a tablet and high resolution satellite imagery, interviewers can easily identify points of interest on map, quickly confirm that all listed households are inside the boundaries of the primary sampling unit, and accurately measure the size of even distant agricultural plots.

Similarly, production and distribution of survey maps has been a tedious, expensive, and error-prone process. Now, Survey Solutions provides survey managers a simple mechanism for assigning each team the digital maps needed for data collection.
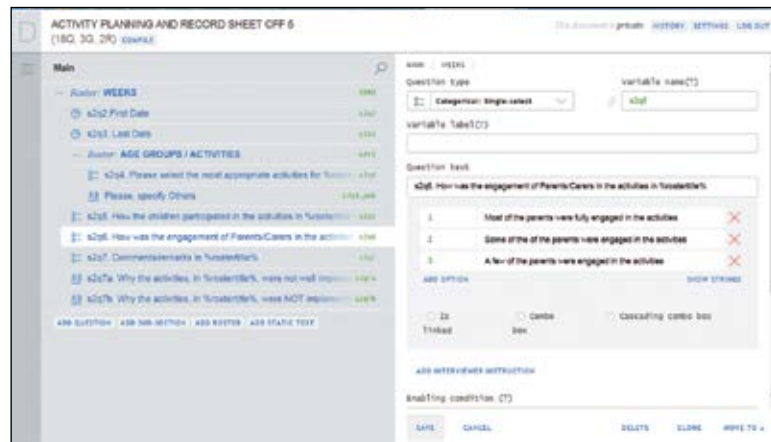
Survey Solutions provides survey managers a simple mechanism for assigning each team the digital maps needed for data collection.

Design questionnaires with ease

The Survey Solutions online questionnaire designer offers a collaborative platform for multiple users to develop and review questionnaires in any Unicode language. Innovative question options capture information that goes beyond pen and paper: the GPS location of the interview, a barcode, or the image of a house, person, document or product. Furthermore, it has never been easier to implement complex agricultural surveys with questions on multiple plots and crops than with the nested rosters available in Survey Solutions!

Multiple validation rules per question and helpful error messages allow for the implementation of data integrity checks of arbitrary complexity, from simple range checks to consistency checks involving complex combinations of multiple questions. C# syntax for validation and enablement conditions is supported by readily available and free documentation, training resources and an international community of millions of C# programmers.

Users can generate a PDF version of the Survey Solutions questionnaire with the click of a mouse in the designer application, as well as preview the questionnaire on a tablet with the Survey Solutions Tester app available in Google™Play.

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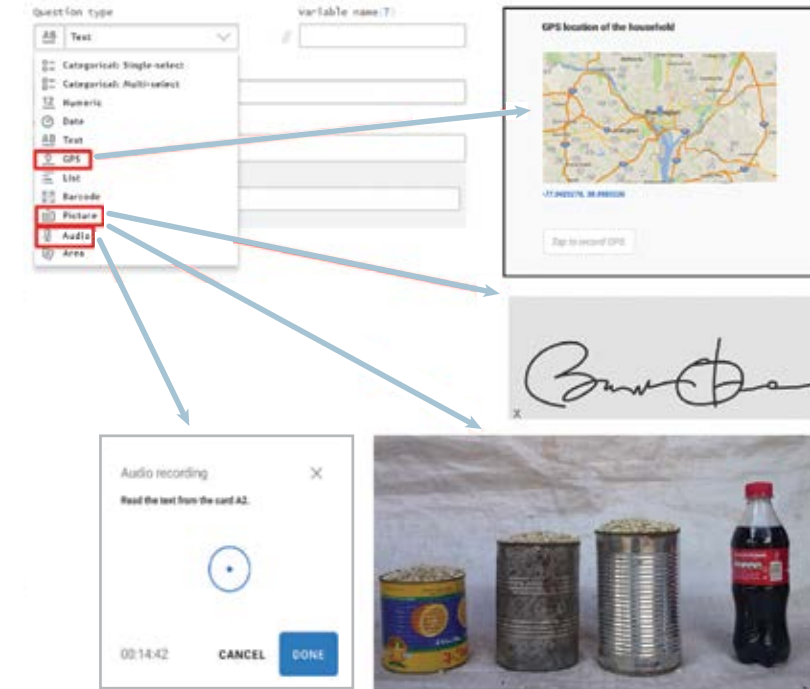
Survey Solutions Designer automatically inspects the questionnaire being composed and provides helpful warnings and error messages, reflecting the best practices of the questionnaire design and preventing common design errors.

Capture any type of data with ease

With a click, Survey Solutions offers all of the standard question types used in paper survey instruments: single-select, multi-select, numeric, text, date, and list. With a further click, users can also select variants for most of these standard types: for numeric, dictate the number of decimal places; for multi-select, specify whether selections are rank-ordered; for date, decide whether the interviewer selects a date from a calendar or, with a tap, captures the current date and time; etc.

With that same simple click, Survey Solutions also offers a wide array of novel question types not available on paper, but increasingly needed for modern data collection efforts: GPS, for geo-referencing households, facilities, etc.; area, for easily identifying and precisely measuring agricultural plots, for example; barcode, for recording the content of QR and barcodes, like national ID cards; picture, for documenting things that defy numbers, such as non-standard units of consumption; audio, for capturing open-ended answers that text cannot; and signature, for recording consent in data collection.

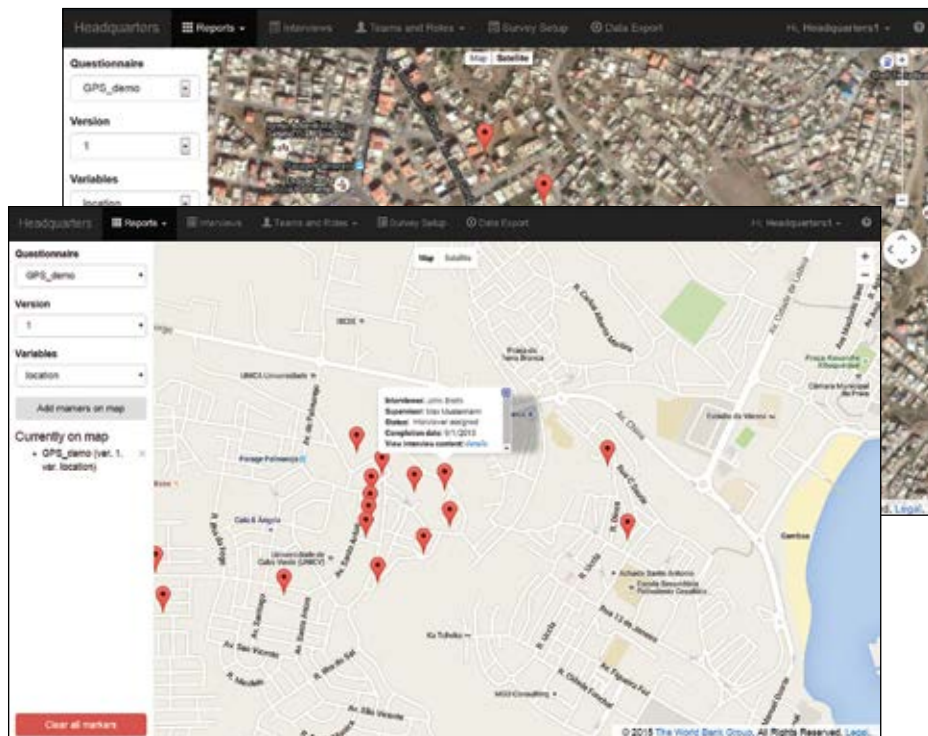With Survey Solutions, capturing diverse data types has never been easier.

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Powerful, configurable, scalable

Survey Solutions components work online and offline, allowing for the best use of available infrastructure. The interviewer application runs on widely available and inexpensive Android™-based tablets. Data is periodically synchronized to a local or cloud-based remote server as soon as a connection becomes available.

The system is highly scalable: no matter the size of your survey, Survey Solutions can handle it. Whether you are relying on a handful of interviewers, or administering a nationwide survey with hundreds of teams, Survey Solutions provides functionality to monitor and visualize survey progression, team performance and survey coverage.

The flow of information is fully controllable by the survey planner and multiple levels of approvals ensure the highest data quality. Furthermore, the equipment is shareable and reusable for multiple surveys: the same teams of interviewers can collect multiple surveys at the same time using the same server for data accumulation and storage.

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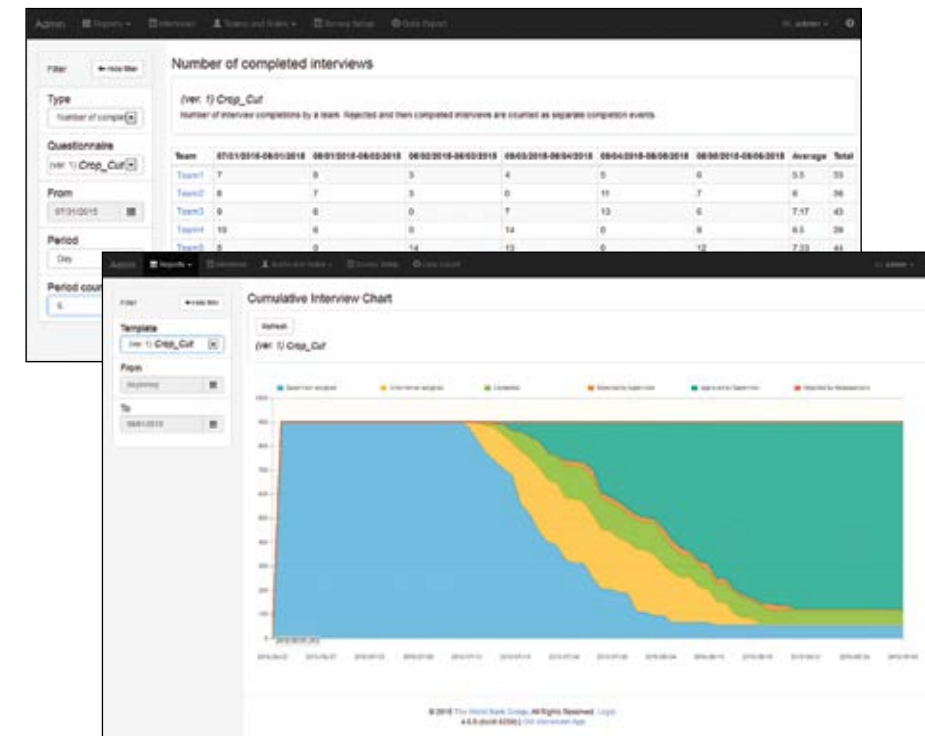
Security and support

Survey Solutions defends your data from unauthorized access. As the administrator of your own server, you decide when and how others can access your data.

Instant data downloads and scheduled backups assure the safety and preservation of the collected data. Logging information on the progress of the survey and interview actions are exported and available for inspection in real time.

Remote assistance is available and Survey Solutions can be set up, configured and serviced over a remote desktop connection. Hosting the server in the cloud allows developers to automatically backup and maintain the installation.

Survey Solutions is supported by a team of experts located in different time zones, ensuring faster and more responsive assistance. Our expert consultants are available for feasibility and suitability analysis, estimation of timeline and resources, project setup and servicing consultations.

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Flexible assignments management for different surveys

Survey Solutions offers survey managers multiple mechanisms for controlling which elements of the survey population are interviewed. If the study design allows, managers can be very precise, dictating exactly which households to interview and providing their identifying information to avoid deviations from the sampling design (e.g., region, district, village, name of household head). For other study designs, managers can make assignments purposefully less precise, dictating where interview teams must collect data, indicating the number of interviews to conduct, but leaving the identification of survey targets to field-based selection protocols (e.g., field-based sampling after listing, quota of survey targets per segment of the population, etc.)

Consider, through a few illustrative examples, the range of study designs that Survey Solutions' survey management system can accommodate.

Imagine a standard Welfare Monitoring Survey of 10,000 households. Because households are selected before the survey begins, the survey manager can distribute the exact list of households of interview, indicating their addresses and names from listing. But because non-response may arise during survey operations, survey managers may need to give field supervisors the discretion to assign interviewers replacement households. Survey Solutions can handle this mix of headquarters control and (headquarters-granted) supervisor discretion.

Imagine now an Exit Interview for Antenatal Care, administered to a fixed number of patients after their visit to a clinic. Because the clinics are selected ahead of time, the survey manager needs to distribute field teams assignments that include the detail of those pre-selected

health facilities (e.g., region, district, name of facility, national facility ID). But because patients cannot be selected ahead of time, the survey manager needs to give field teams the ability to conduct interviews with eligible patients that happen to visit the health facility on the day of data collection, while respecting the number of interviews per facility that is part of the study design. Survey Solutions allows managers to assign a quota of interviews to be conducted in a set of predefined locations, dictating the identifiers for the locations at head office but making the identifiers of the patient the interviewer's responsibility.

These are simply illustrative examples of Survey Solutions' range and flexibility in survey management. Many other study designs can be easily accommodated. Moreover, the survey manager use several management tools simultaneously for the same study–for example, dictating the households to interview in enumeration areas that have been listed, but allowing field-based selection in enumeration areas that were not listed before survey operations began.

CAPI/CAWI and mixed modes of survey administration

Survey Solutions also offers survey managers the choice of multiple modes of survey administration, and the flexibility to move seamlessly between or to combine those modes in order to meet survey needs.

As a Computer-Assisted Personal Interview (CAPI) package, Survey Solutions facilitates traditional, face-to-face interviews. But in addition, Survey Solutions also provides tools for Computer Assisted Web Interviewing (CAWI), where questionnaires are distributed to respondents (either via email or a public link) and respondents complete the questionnaire themselves.

Because modern surveys often require mixed modes of administration–that is, interviewing some respondents face-to-face but reaching other respondents via web–Survey Solutions offers survey managers the facility of creating a single questionnaire, administering it in one mode or the other, and compiling the resulting survey data conveniently in a single database.

Survey Solutions can help facilitate surveys, in which interviewing is conducted over the phones. In this mode the interviewers can work from their offices or a specialized call centre. They can chose to use a tablet device, or alternatively, a computer with internet connection to guide them through the questionnaire, read the questions to and record the responses of the interviewee. The advantages of using a computer as a data entry device are numerous, such as possibility to reuse existing equipment, larger screens, use of keyboard and mouse for navigation, and other. As with other modes of data collection, this data becomes part of the same survey and can be mixed with other modes, such as face-to-face interviewing and self-interviewing.

With the advent of new data needs and the rising cost of face-to-face interviews, your organization may soon need to employ several modes of survey administration. Survey Solutions offers a single software platform that simultaneously meets the needs of today's face-to face interviews and anticipates the demands of tomorrow's web data collection.

Survey Solutions provides several modes to accommodate virtually any survey design.

Control the quality of your data

Four levels of quality control help ensure quality of your data: automatic validations, supervisor data verification, headquarter data verification, and optional external validation.

1) Automatic rule-based validation helps notify the interviewers about the data problems immediately, still during the interview when they are easiest to fix. Powerful C# language allows specifying complex validation conditions, and can be further extended with macros and lookup tables.

2) Supervisor validation allows benefiting from supervisors' intuition and knowledge of the area of data collection, and helps in verifying the interviewers follow the data collection protocol.

3) Headquarter validation allows headquarter users to centrally monitor the quality of the incoming data, adherence to the established procedures, identify the problems appearing in the field, reject questionnaires approved by supervisors, which still don't satisfy the requirements.

4) Optional external validation allows exporting the data and utilizing external tools (or external data sources) not available in Survey Solutions to validate the survey data at regular intervals, for example nightly or weekly. This allows searching for errors across all the interviews, for example to identify outliers.
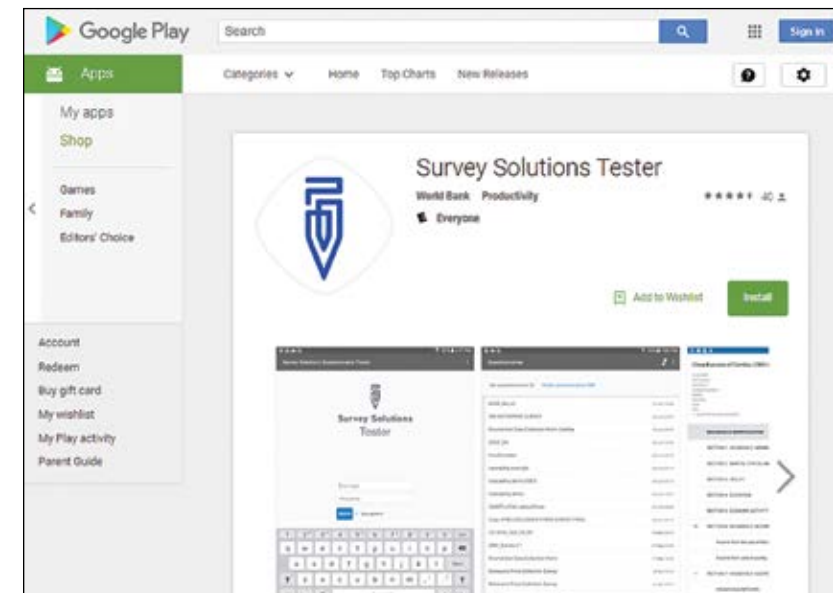
Each of these layers of defense allows improvements in data quality. But they are most effective in their combination. In addition, the use of Survey Solutions CAPI simplifies navigation in the questionnaire, automatically hides questions to be skipped, and provides proper input controls corresponding to the question types further reducing the possibility for user mistakes and improving the quality of the data.

Tester App

Survey Solutions questionnaires are electronic documents that include not just the text of questions and options, but also contain the logic of skips and rules of validation for the content, which may be non-trivial for most real world surveys. Testing a questionnaire for completeness, ergonomics, performance, convenience of navigation, usefulness of error messages, and other such features becomes extremely important in the context of a CAPI system and needs more attention from the questionnaire designer.

A specially created tool, Survey Solutions Tester, is freely available at Google Play for this purpose. It allows the questionnaire designers to get an accurate impression of how the questionnaire will appear and behave on the actual Android device. The Tester application works directly with the Designer site, without having to involve the full server infrastructure. This radically improves the speed of the questionnaire development and results in better quality questionnaires. Survey Solutions Tester is also a handy tool during trainings to illustrate a particular situation in a questionnaire or study a publicly available example questionnaire.
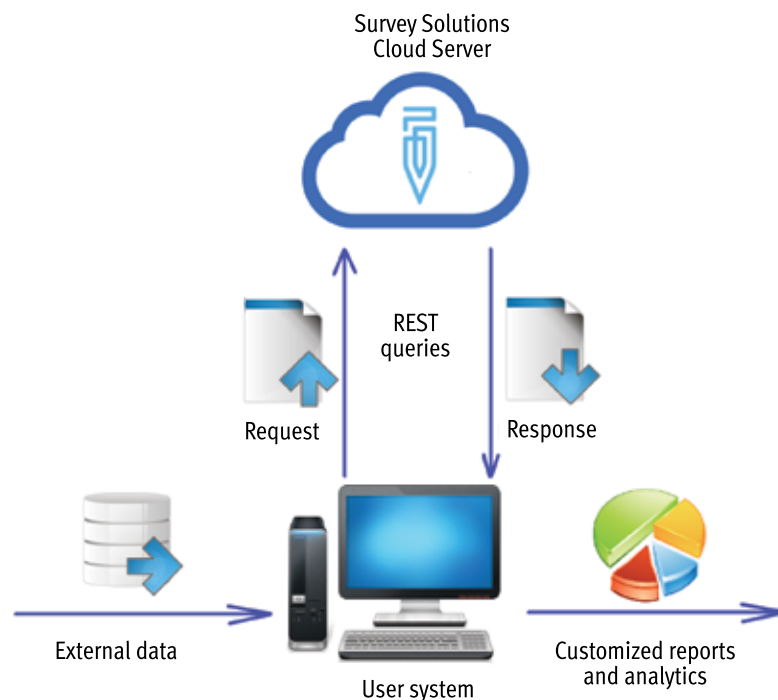

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Application Programming Interface (API)

The Survey Solutions servers provide REST API, which allows advanced users integrate Survey Solutions data collection and survey management system into their larger systems. Typical applications include automation of supervision and building closed-loop systems for high-frequency data collection, custom analytics, and other uses.

The API user may execute the code in any language or programming system as long as it can generate valid REST queries and understand the response of the Survey Solutions system. Typically such system may also contain a statistical package (e.g. Stata, SPSS, R) to facilitate computations, or may be written in a general purpose programming language, such as C#, Python, etc.
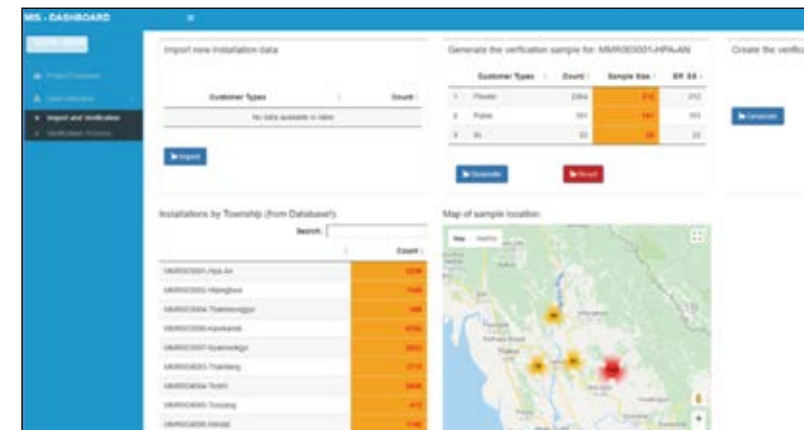
Often such a system consumes an existing external database to create assignments for the Survey Solutions. External systems may supply data from administrative databases, remote sensing data, data from earlier surveys and other sources. The authorization and access to these systems is handled by the user code and later the REST queries are called to supply this data to Survey Solutions in the form of assignments.

Survey Solutions Cloud Server

REST queries

Request — Response

External data

User system

Customized reports and analytics

During the field operations a user system may utilize the API to perform automatic quality control operations and provide additional reporting:

- download survey data and paradata fully and at any time even before the end of the survey;
- utilize external sources of information to validate the data being collected;
- perform distributional checks, such as outliers detection, and marking such interviews with comments;
- automatic rejection of interviews not satisfying quality requirements;
- automatic approval of interviews that do not raise any flags in validations;
- automatic generation of replacement assignments;
- construct reports on refusals and similar reports on the data quality;
- publish dashboards with multiple indicators on the survey progress and data quality for monitoring purposes.

At survey completion a user system may be instrumental in transforming the data, cleaning it from remaining errors, and transmitting it to data repositories, such as ones managed by MS SQL or Oracle servers.

Survey Solutions API users can program their own custom dashboards.

Automation of routine operations through API is especially useful for large surveys, time-bound surveys (such as censuses) and surveys with repetitive transfer of data (such as panel or multi-visit surveys) where the quick response of the Headquarters is critical for the field operations.

The complete and up-to-date description of the available REST queries and their parameters is available from any Survey Solutions server, for example: https://demo.mysurvey.solutions/apidocs/index.

Survey Solutions at a glance

➤ Free Computer-Assisted Personal Interviewing (CAPI) software platform

➤ Out-of-the-box functionality for the complete value chain of survey data collection

➤ Rich data capture and the capacity to handle large multi-topic surveys and panel surveys

➤ Flexible data aggregation engine

➤ Powerful ability to manage large numbers of survey teams

➤ Cost-effective, sustainable solution for developing country institutions involved in data collection

➤ Fully compliant with local data privacy and confidentiality laws via hosting on local servers

Survey Solutions contacts:

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WORLD BANK GROUP

Records to date

2.6 MLN
Households in the largest completed survey

10 MLN
Persons interviewed in the largest completed survey

3,000
Questions in the biggest questionnaire, arranged in 94 rosters, 130 sections and sub-sections

12,000
Largest number of interviewers handled by a server

110,000
Number of interviews coming to a server per day

140+
Number of countries where surveys were conducted with Survey Solutions