

Part 2 – Technical Design and Implementation

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1. Introduction

As described in the part 1 of this session, cost saving strategy was to move only a portion of the panel's respondents into a mixed mode protocol. This paper describes the technical design of the new sample management system that was used for that portion of the sample that was moved to a mixed-mode protocol. Most sample remained in a single-mode protocol. A later paper (part 8) will describe the modifications that were made to integrate Blaise 5 with Survey Research Center's (SRC) main single-mode system.

The addition of web as an available mode in the Health and Retirement Study (HRS) core survey for the 2018 wave brought with it several technical requirements that had not been a significant part of previous waves:

- Issue login credentials to respondents.
- Monitor web activity and manage respondent access to the survey based on that activity.
- Move cases to non-response CATI follow-up based on specific conditions.
- Remove cases from non-response follow-up immediately if the respondent completed the survey through the web.
- Deliver cases to CATI interviewers based on specific rules that take recent activity into account.

To accomplish these objectives, HRS selected the Michigan Survey Management System (MSMS) for the web/CATI non-response follow-up portion of the 2018 wave.

2. Major System Architecture Elements

MSMS is designed to manage mixed-mode protocols by coordinating the following functions:

- Execute specific data collection protocols.
- Interact with Blaise 4 and Blaise 5.
- Interact with email and text message service providers.
- Provide source data to SRC reporting systems.
- Manage sample contact information, such as addresses, phones, and emails.

MSMS is built around three key elements.

1. Break work into tasks and structure the system around them.
2. Use an automated task rules engine to manage manual and system tasks easily within a single project.
3. Use web- and API-based, real-time communications between internal and external applications and services.

2.1 Tasks

Tasks are the unit of work within the system. For HRS 2018, the single data model represented two tasks in MSMS: ConductWeb and ConductCATI. Each survey session (open and close of the instrument) in Blaise contained a value that indicated the mode in which the session was conducted, which allowed that

session to be mapped to one of the two tasks. Through this mechanism, MSMS records all Blaise activity against the appropriate task.

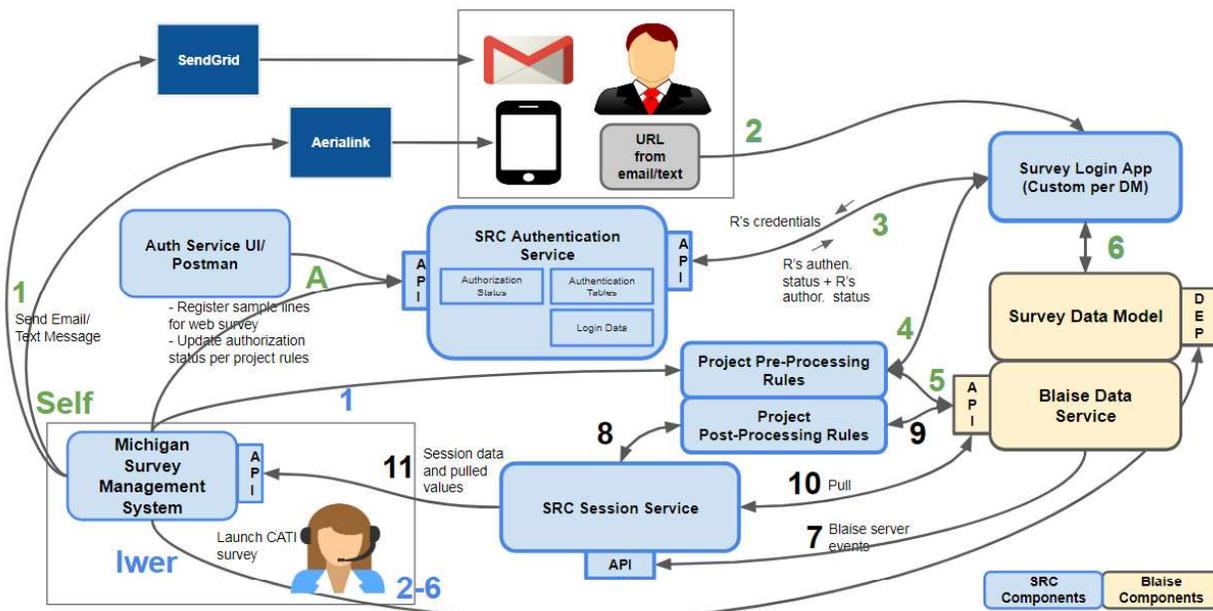
2.2 Automated Task Rules

MSMS includes an automated task rules engine, which assigns tasks to the appropriate personnel or system based on the project’s protocol. Automated rules are particularly good at triggering system tasks, such as sending emails or turning on access to a web survey, freeing staff to focus on higher value work. Automated rules can also signal staff when more manual work, such as sending letters, must be done. Automated rules are simply a set of if-then conditions. When they include a wide range of condition and action options, you can build powerful workflows that leverage your resources. Automated rules also allow reproducibility. During our adjustment to automated task rules that would incorporate web into an effective mixed-mode protocol, we learned several lessons.

- Automated rules require at least a moderate amount of up-front definition, which was new to us and may be new to some organizations.
- Think about worst-case scenarios. If a logic error in the rules or a manual error acts on a large batch of cases in an unintended way, how will you recover from the error?
- Start small. Iterative and incremental became our mantra.
- It is easy to build rules that are too complicated to be feasible technically or operationally.
- Handling edge cases manually is completely appropriate, but staff can’t act on what they can’t see. Create visibility with automated task assignments to signal needed reviews.

2.3 Real-Time Communications

SRC has built a number of web service-based services and utilities to integrate MSMS with the server-based deployment of Blaise 5 that is used for web surveys. The communication flow is almost all in real time, because it is difficult to manage flows that include automated mode changes without real-time communications between system components. The components in light blue in the diagram below are those that SRC built to complement Blaise 5’s server-based implementation and are part of the technical design that SRC used for the web/CATI portion of HRS 2018.



These components each have specific responsibilities within the integrated workflow. For example, the flow for self-administered surveys goes through several components that are not included in the interviewer-administered flow. These are specific to the management of self-administered surveys. They control the respondent's access to the survey based on real-time status of both web and CATI activity.

- Email and text services (SendGrid and Aerialink, respectively) are vendor services that SRC uses to send emails and text messages to respondents and manage the flow of bounced and returned messages.
- Authentication Service confirms the respondent's credentials and the current authorization status for that case for that instrument.
- Custom survey login app contains the public-facing login page and logic for routing the respondent to the Authentication Service, other pre-survey validation, and pre-processing rules that may apply once the case is validated.

Both self and interviewer-administered surveys use the Session Service, which is downstream from Blaise. The Session Service is built around Blaise server events that are published by Blaise to subscribing web services. Blaise publishes StartSession and EndSession events. EndSession events trigger the Session Service to pull values from the Blaise instrument through the Blaise API. The package of pulled values and Blaise server event metadata is published to MSMS, which records a contact record on behalf of the respondent for self-administered sessions. For interviewer-administered sessions, the package awaits the contact record that is recorded by the interviewer in MSMS.

When contact records are recorded, the project's automated task rules are run for that case. The task rules change the statuses of existing tasks or create new tasks, based on whether the respondent completed the survey in that survey session and on values pulled back from the survey at the end of that session. Information flows in real time to the reporting system and is available in reports or for query by the project's operations and analysis teams. The case is then ready for the next action to be taken.