

Enhancing Mobile Enrollment Procedure using sProject

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Abstract — *The sProject is an umbrella that covers three major components. Those components are Image Mapping Tool, Mapping Logic and Image Conversion. The Image Mapping Tool main goal is to configure positions on top of an image while the Mapping Logic is designed to interpret those specified positions. Finally, Image Conversion purpose is to translate the images. In general the sProject enhances the mobile enrollment process drastically with faster configuration and better quality images for a better user experience.*

Key Terms — *Electronic Documents, Electronic Signature Capture, Mobile Enrollment, sProject.*

INTRODUCTION

Technology has substantially evolved during the last two decades. It has especially evolved to mobile environments such as smartphones, internet devices, and tablets. However, most of these technologies did not exist when most enrollment processes started back in the seventies or eighties.

The traditional approach to enrollments is done manually by using paper forms. There are many disadvantages in this approach in which the primaries are information exposure; papers are prone to be lost, breakable, and fragile. Another disadvantage would be material cost such as printing, ink used for documentation, and delivery which would all be factor of cost increase.

On the other hand, there is the modern approach. It incorporates advances in technology to facilitate the process. Some principal advantages of the modern approach are (1) security and safety, (2) better image quality, (3) instant access by back-end users, (4) electronic business workflows, among others.

The main disadvantage of this approach is the cost of the first investment the company will incur

for buying appropriate equipment. However, the return of investment will be higher in no time.

The sProject complements the modern approach in many ways. It revamps the process with features such as signature capture, requiring signatures and better quality images. It also enhances the process with dynamic text re-size based on mapping position width. The size of the image, the screen, the resolution, or the font size of the mobile equipment does not matter thanks to all mentioned features.

The sProject relies on HTML5 [1], JavaScript [2], and especially the HTML5 Canvas [3]. The Image Conversion logic relies on code developed using the C# programming language.

The sProject helps in reducing project cost, since it reduces the time required for configuration, while also preserving software quality.

MEDICARE MOBILE ENROLLMENT PROCESS

These days, any process involving documents for Medicare [4] are subject to approval by an organization called Centers for Medicare & Medicaid Services (CMS) [5]. CMS not only manages any process or program for Medicare or Medicaid, they also require for any private company to annually submit their Enrollment Form Templates for approval. This submission process guarantees that private companies are working according established standards by the organization. CMS establishes a period called Annual Enrollment Period (AEP) in which any senior citizen or handicap could apply for a Medicare plan. There are also some exceptions in which citizens could apply outside that particular period, such as moving into another place of service where their actual plan does not provide coverage.

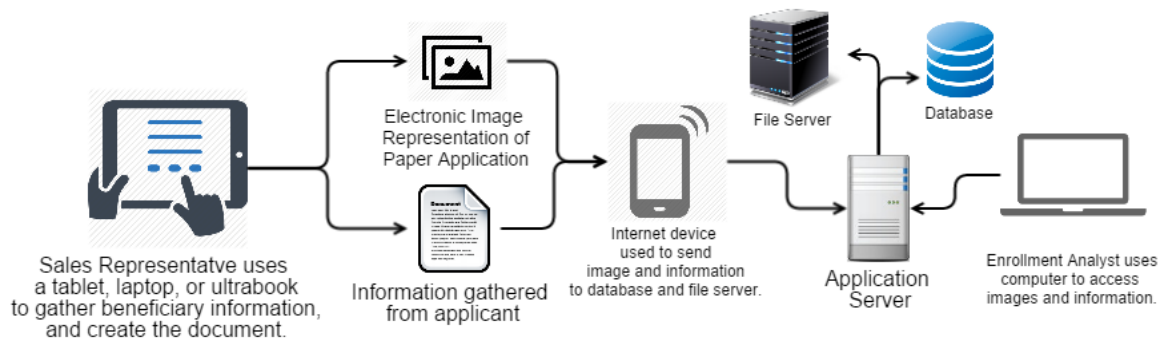


Figure 1
Mobile Enrollment Process – Modern Way

Now traditionally, once CMS approves the private company’s template; the company is able to acquire new beneficiaries through those new approved offerings. To accomplish this, they entitle sales representatives to try and convince senior citizens why their offerings are best for their needs.

which region works for, it could take up to two (2) or three (3) days for the form to arrive to the enrollment department. CMS regulations establish constraints in time for an application to be processed. This depends on the condition in which the applicant is enrolled.

Application Process

Approval Process

The application process relies mostly on two steps. The first step is to arrange a presentation meeting between the beneficiary (possible applicant) and a designated sales representative. Sales representative must submit a Scope of Appointment document where he/she gathers basic information. The second part consists in making a deeper presentation of the offering in which the applicant might be interested. At this point, sales representative would ask any eligibility question that might lead him to decide which plan is better to fulfill the applicant needs.

The approval process consists of the enrollment department cautiously reviewing the application, and confirming that information is as accurate and legitimate as possible. Otherwise, it is returned to sales representative to gather more information or correct the given one. This particular process is very important given the fact that Medicare processes are highly regulated.

Finally the applicant could then proceed to request an application and complete the required information. The sales representative helps the applicant fill in the information (demographic, plan, Medicare, emergency contact, legal guardian, etc.) in the application and also explains some rules and regulations about the plan. Once the sale is made it goes to the enrollment department, of the private company, where it is processed to verify if the applicant truly qualifies for Medicare.

Enrollment analysts make a first revision to any application that is received. If it passes the revision, it is submitted to CMS. Their analysts examine the application thoroughly to determine if applicant is officially eligible. Some results might be: (1) require additional information to be able to determine eligibility or (2) they could simply deny the application because applicant is not eligible by any reason. This concludes the mobile enrollment process.

MOBILE ENROLLMENT – TRADITIONAL APPROACH

Now, it is important to mention that this process is normally done by the use of paper forms. Depending on how many meetings a sales representative has throughout the day, and also

The traditional approach is performed using paper enrollment forms or applications. There are various advantages and disadvantages with this process.

Some advantages are:

- Cheaper and accessible most of the time.
- Easy to handle.
- Understandable by anyone.

Some disadvantages are:

- Increases cost in papers and materials.
- Hand-written applications are prone to writing mistakes (typo), which involves using a new application.
- Given the fact of the nature of the document (Medicare Enrollment document), it exposes sensitive data that is not protected.
- No possible way to protect the information therein.
- If handled improperly, papers are likely to be lost.
- Application takes longer to be processed.

Even though paper handling process has disadvantages, it is still a preferred method for handling applications for most services. A few improvements and adjustments could be applied to this process to make it better, faster, and secure.

MOBILE ENROLLMENT – MODERN APPROACH

An advanced and enhanced way of accomplishing the Medicare enrollment process is to incorporate the use of technology. Technology has evolved substantially in many ways. These days, human beings enjoy: (1) faster network bandwidth, (2) internet access at the palm of their hand through cell phones, (3) mobile wireless equipment, (4) laptops, (5) ultrabooks and (6) even tablets.

Technology components that could be used to enhance the process are:

- One or more application servers.
- One or more file servers for image storage.
- One or more database servers for information storage.
- An Enterprise Content Management System [6] for handling stored images.

- A laptop, an ultrabook or a tablet with software capable of information gathering and image capturing.
- An internet connection device for uploading information and images into application server.
- Email access to receive confirmation of receipt for each uploaded application.

Those are the fundamental components of the modern approach (see figure 1 above). For these components to work they require a specific order otherwise it will not work properly. First you gather the information and capture the image. Then, you review everything is correct. Once everything is satisfactory, you proceed to use the internet device to send the information and image. The images are stored in a file server. The information is directly stored into a database. After the data have reached the servers successfully an email is sent back to sales representative's cell phone with corresponding confirmation number. Right at this moment, the information and images are available for the enrollment department personnel to review them as necessary. See Figure 1 for a better illustration.

Software Tools

There are many software tools that are used to accomplish this kind of workflow process. One of them is OnBase [7]. It is an enterprise content management system (ECM) developed by Hyland Software. OnBase is a powerful and robust ECM that provides access to all stored information and images or documents. It also provides the ability to configure workflow for stored documents, generate reports, internal and external email, indexing and so much more. In particular, OnBase specializes in providing you access to images and information already stored in it. However, these images and information need to be captured.

OnBase provides a separate module called Front Office Scanning (FOS). Its goal is to scan or capture documents and their information. With this tool you can scan any document you want and send it to OnBase for storage and retrieval.

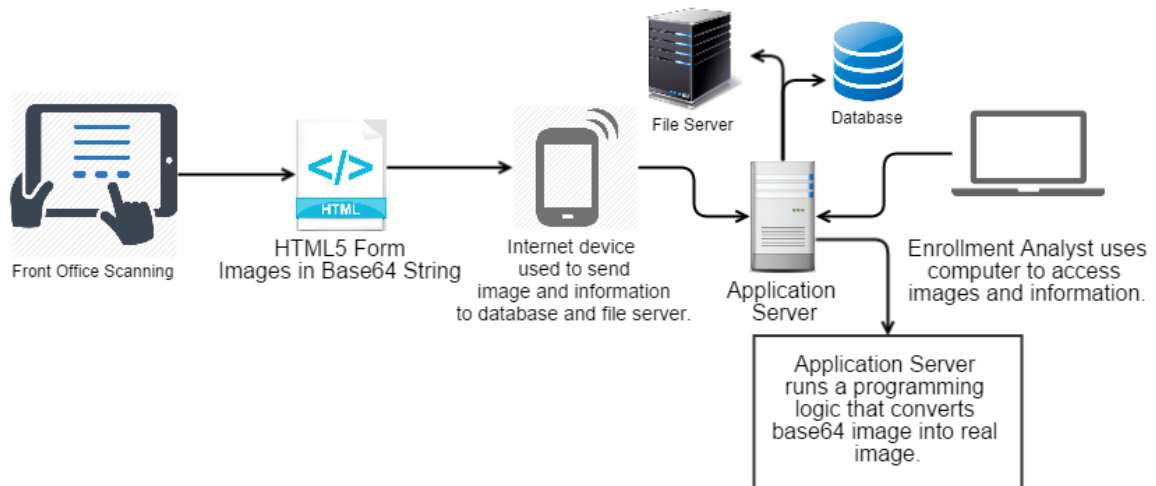


Figure 2
sProject and FOS Integration

Also one of the features FOS provides is the ability to capture information, store them locally until you have internet access to transmit them into OnBase. This is a very important feature since there are areas without internet access.

FOS works by capturing the information upfront and then populating that information as needed throughout the entire documents. The Medicare environment has many documents such as the enrollment form, durable medical equipment, and protected health information documents. These documents have keywords in common such as applicant name, last name, street address, home address, cell and home phone numbers, among others. This feature allows the user to ask the information once without irritating the applicant for asking more than once the same thing.

OnBase and Front Office Scanning use a powerful module, developed by Hyland Software, Inc., called E-Form. It works by creating an HTML Form that acts as a template in OnBase and also FOS. The information (keywords and metadata) is stored separately. Keywords are stored in the database. Metadata (named input fields) is stored in an encoded URL string in the file server. Input fields without name attribute are ignored. Image Conversion (mentioned later) takes advantage of this functionality to gather the images (base64 [8]).

Hardware Requirements

As mentioned earlier, there are some hardware required components involved in the process. Since OnBase runs in a Windows environment at least the application server must run Windows Server OS. Also the application server must have an Internet Information Services (IIS) [9] instance running. Even though the application server is required to run on Windows, the file server could run Linux or Windows because it only store images. However, it is preferred to maintain a standard between servers for the same application so it is best that it also runs the same operating system as the application server. The Database server could be either Oracle or MS SQL. MS SQL is preferred. The environment could use as many servers as needed as long as they follow these requirements.

THE SPROJECT

sProject is the result of research for finding a way of reusing paper forms. It integrates with FOS and any other software capable of capturing information. The purpose of the sProject is to stroke information gathered and signature handling. This software works regardless of the resolution and font size used in tablets or laptops. FOS provides a feature that allows stamping signatures on top of an image. The major downside to this feature is that

you cannot adjust the text size based on the size of the area.

The best way to satisfy the requirements is to use HTML5, JavaScript, and especially the HTML5 Canvas. By using this technology, it would take advantage of the E-Form module and be able to integrate with OnBase and FOS seamlessly. The main concept and flow of the process stays virtually equal as the modern way illustrated before. Even though the only difference in the process is transparent to the end user it is worth mentioning. See Figure 2 for reference.

The sProject depends on three separate parts which cannot work independently even though they are separated. The first part is used to configure the positions where the information is going to be placed. The second part is the logic that involves the interpretation of all configured positions and is also in charge of populating the information in its corresponding place. Also it handles signatures and where the signature needs to be placed. The third part is the logic used inside OnBase. The logic interprets the base64 string (image), received from FOS, and converts it into what we know as an image. By using this approach the screen size, resolution or font size of equipment is not a constraint.

Image Mapping Tool

This tool is the first and most important part of the sProject. Image Mapping Tool is a local HTML application that is used to map places on top of images. This basically tells the second tool (Mapping Logic Tool - described later) where to place the information.

For Image Mapping Tool to work properly it relies on a list of keywords, images, and mappings. It also allows you to sort images in a particular order. For an illustration of the Image Mapping Tool see Figure 3 for reference.

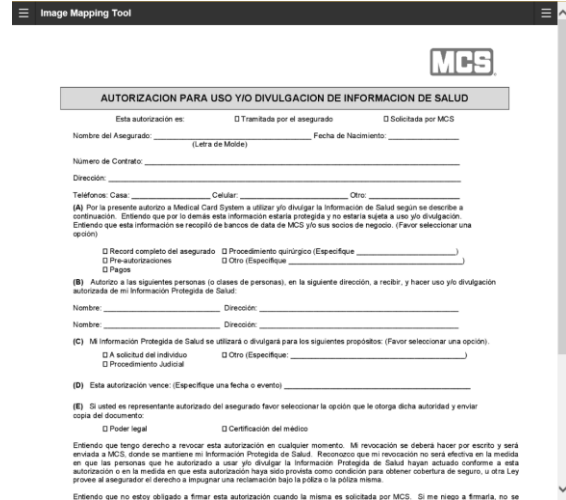


Figure 3
Image Mapping Tool
Using Image Mapping Tool

The first step to do after opening Image Mapping Tool is to drag and drop the images on the white blank area (images could all be dropped at the same time or one by one). Images will load one by one and the first one will be displayed just as in Figure 3. To make sure the order of images is correct you should open the right menu and by dragging the page, you could sort it as need it. It is very important that the order is correct since that order is used by the tool to generate the template. In the same menu choose other pages by left clicking on it. See Figure 4 below.

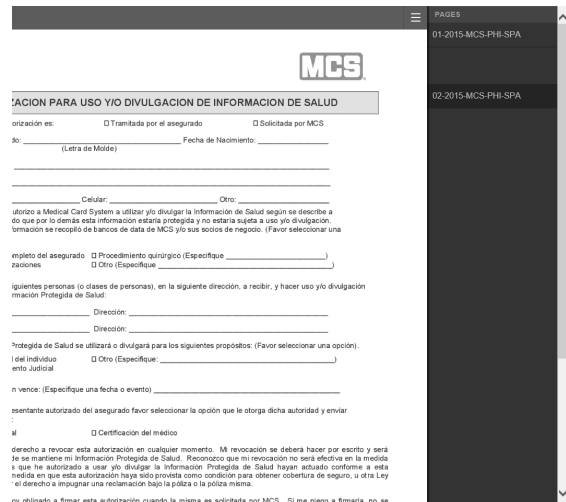


Figure 4
Ordering Images in Image Mapping Tool

The Imaging Mapping Tool requires a list of keywords in which the information is temporarily stored by FOS. In other words the same list of keywords FOS uses you will have to provide it to the tool. The list is expected in a particular xml format structure; see Figure 5 for reference.

Now, to provide the list to the Image Mapping Tool open the left menu and left-click on “Load Keywords”. Copy and paste the xml structure list inside the textbox and click on “Load”. See Figure 5 for reference.



Figure 5
Loading keywords into Image Mapping Tool

Now, you can start mapping positions to their corresponding keyword. For example let's map the name and last name. See Figure 6 below for reference. The same thing is done for checkboxes, except that for checkboxes you provide a matching value. If this matching value is satisfied then an "X" is stroked on top of the checkbox. Signatures are also configured the same way.



Figure 6
Keyword - Position Mapping

If by any reason you have to stop mapping before finishing, the tool provides a way to store sessions. Just open the left menu and left-click on “Save Session”. Copy and paste the text displayed and save it in an xml file. To load the session, just open the left menu and left-click on “Load Session”. Copy and paste into the textbox the xml structure you previously saved. See Figures 7 and 8 for reference.



Figure 7
Saving Session XML Structure

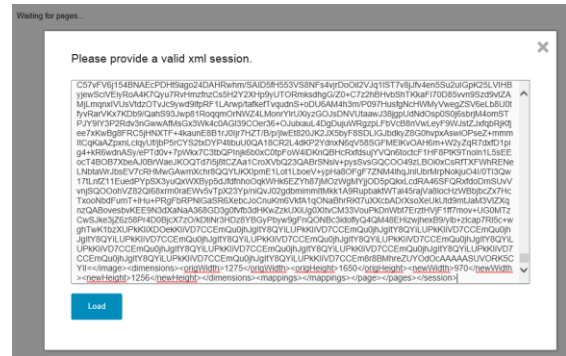


Figure 8
Loading Session XML Structure

Whenever you finish mapping all necessary keywords to their corresponding places you must generate the HTML template form. The template markup contains:

- Images (base64)
- Keywords
- Mappings
- Signatures
- Signature pad

To generate the template form, open left menu and left-click on “Generate Form”. Copy and paste the entire content of the textbox in an HTML file. It is very important that you do not alter in any way

the HTML template markup to prevent failure. See Figure 9 for reference.



Figure 9
HTML Template Form Markup

Mapping Logic

The Mapping Logic is the code behind the scenes that creates an HTML5 Canvas for each image, and starts stroking the information according configured mappings. It is in charge of interpreting each mapping. According to the mapping coordinates it paints the information on the canvas.

The logic detects if text is larger than mapping width, therefore it will automatically start reducing font size until it fits. The same happens for signature pad, it is automatically re-sized based on width of the signature mapping. If it does not fit in the space provided, it is scale to fit. See Figure 10 below for reference on end-result before transmitting.



Figure 10
End Result before Transmitting

Image Conversion

Image Conversion is a C# code logic that traverses throughout images inside the E-Form received, and converts them into real images understandable by human beings.

BENEFITS OF MODERN APPROACH

By just implementing this approach a few benefits are gained such as,

- Local encryption of information until upload.
- Secure transmission with SSL certificates.
- Less configuration times for template.
- Precise mapping and signatures regardless of device resolution, size, and also font size.
- Better image quality.
- Require signatures.
- Instant access by back-end department.
- Instant confirmation of receipt by email.
- Since Mapping Logic is designed with Web technology, you are not only tied to FOS. Any software or Web page that can populate values will work.
- Generate reports of gathered information.
- Pass documents through a business workflow.
- Make copies of digital documents as necessary.
- Easily send digital copies to partners such as medics, or pharmaceuticals.
- In this particular case, you can track sales based on regions, sales representative, etc.

CONCLUSION

The sProject revamps mobile enrollment process with many features. Those features are (1) information gathering, (2) electronic document creation, (3) populating information, and (4) capturing signatures. These features improve many small, medium and large companies overcome the traditional mobile enrollment approach and the use of paper. The electronic mobile enrollment process using the sProject; helps companies reduce cost, revamp their business workflow, and control over their sales operation. An electronic mobile enrollment provides companies security, safety, and assurance that sensitive information is protected. Also, implementing an electronic mobile enrollment in a company instantly gives you tools such as reporting, tracking, auditing for a better management process.

As demonstrated, the sProject improves performance and enhances mobile enrollment processes. However, it is not only tied to mobile enrollment processes. Any application, software, tool or process that supports populating information into an HTML form is capable of being enhanced by the use of the sProject.

FUTURE WORK

Additional attention should be paid to the sProject software features. Image Mapping Tool could still offer much more features such as,

- Signature reordering.
- Changing image while keeping previous mappings.
- Deleting pages.
- Make tool user-friendlier.

As for the Mapping Logic, I would like to keep improving performance and types of mappings it could accept such as checkmarks, squares, circles (in radio buttons), etc. Deficiencies of FOS that can be improved are:

- Datasets are not editable.
- Does not validate required signature.
- Does not identify documents that belong to a dataset.
- Does not allow to delete and entire dataset and all its documents.

There is also developing on a project called Unity Capture. It mitigates all deficiencies of FOS. Unity Capture uploads images directly without an extra step in the application server. See Figure 11 for a sneak peek as how it looks.

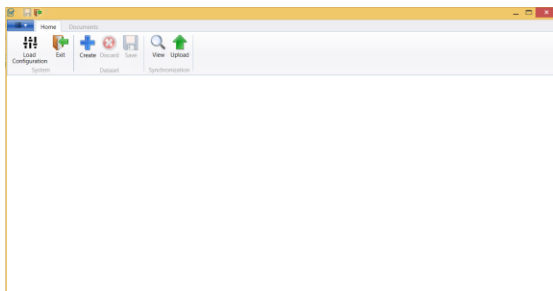


Figure 11
Unity Capture Prototype

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