

Sending Text Messages to your Phone via the DATA Step

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ABSTRACT

Text messages (SMS) are a convenient way to receive notifications away from your computer screen. In SAS®, text messages can be sent to mobile phones via the DATA step. This paper briefly describes several methods for sending text messages from SAS® and explores possible applications.

INTRODUCTION

Text messages (Short Message Service or SMS) allow cell phone users to receive short messages without the need for an internet or data connection. This gives SMS an advantage compared to other forms of modern communication such as email and various social networks. Text messages are widely used for everything from private conversations to shipping notifications due to the ubiquity of cell phones and general ease of use.

This paper discusses two methods for sending text messages using SAS code, using either the cell providers' email-SMS gateway or Amazon Web Services' Simple Notification Service. Afterwards I will suggest some possible applications of these techniques for SAS programmers and briefly discuss the relative merits of the two methods. It should be noted that the name of this paper is not perfectly descriptive, as one of the methods discussed in this paper does not make use of a DATA step. When I chose the title I had not yet fully explored the topic or figured out the best way to make use of Amazon SNS. I hope readers will forgive this slight incongruity.

EMAIL-SMS GATEWAY METHOD

It is possible to send a message from an email address to a cell phone as a text message. This is done in the same manner as sending a normal email, except that instead of a conventional email address for the recipient the message should be sent to an address which consists of the phone number of the recipient and a domain which depends on their cell provider. For example, to send a message to a T-Mobile phone using the email-SMS gateway, one need only send an email to an address of the form `phonenumber@tmomail.net`.

These messages are governed by restrictions placed on them by carriers, which can vary significantly. For example, emails sent to T-Mobile phone numbers are automatically converted to MMS (Multimedia Message Service) messages if they exceed 160 characters. By contrast, AT&T maintains the `@txt.att.net` domain for SMS and `@mms.att.net` for multimedia. However, AT&T blocks messages sent using these domains by default and their customers must go online to specify which domains they will accept messages from. I recommend you investigate your carrier's policies before attempting to use this method.

There are three methods for sending emails from a SAS DATA step: MAPI, SMTP, and VIM. All three methods are suitable for sending text messages via an email-SMS gateway, but for simplicity's sake this paper will assume the use of the SMTP (Simple Message Transfer Protocol) method. The MAPI and VIM methods work in a similar manner. Examples will assume the use of a webmail address such as Gmail.¹

¹ For a more thorough introduction to the topic and the three methods I refer readers to Erik Tilanus's paper "Using Mail Functionality in SAS" (2013).

In order to use Gmail for this purpose you must turn on access for less secure apps. Other email clients may require additional setup. Regardless, you will need to do some setup in SAS with an options statement:

```
options emailhost=
  ("smtp.gmail.com" port=465
   SSL auth=plain
   id="your_address@gmail.com"
   pw="your_password");
```

The next step is to set up an ersatz fileref with the EMAIL option.² Rather than specifying a file location as the output destination, the EMAIL option allows you to link PUT statements to the previously configured email address. You may then write your email in the same manner as you would write to a text file:

```
filename myemail email to="address@domain.com";

data _null_;
  file myemail;
  put "Witty and insightful remarks";
run;
```

In order to send a text message, the only difference is that the email address specified as the recipient in the FILENAME statement must be one constructed based on a phone number and a cell provider as explained above.

AMAZON SNS METHOD

Amazon SNS (Simple Notification Service) allows users to push updates to mobile devices. In addition to updates to mobile apps or emails, these updates can take the form of SMS text messages. However, at the moment this service can only send messages to US phone numbers. Amazon offers SNS users the option to pay for additional support, but otherwise use of the service is free as long as they send less than a million messages per month³. With the use of the AWS (Amazon Web Services) API, it is possible to write SAS programs which send text messages without using the email-SMS gateway. Use of this method requires an AWS account and requires you to install and configure the AWS command line interface. The API can then be accessed from SAS via X commands.

Once you have created an AWS account and logged in to the AWS console, you must set your server to "US East (N. Virginia)"⁴. Having done so, you can create a topic and a subscription, setting the protocol to SMS and the endpoint to the phone number you wish to send messages to. At this point a message will be sent to that number asking for confirmation. When you publish a message to a topic, it will be sent to each endpoint which has been successfully subscribed to that topic. Each topic has a code associated with it called the Topic ARN (Amazon Resource Name), which will allow you publish messages to that topic via the command line interface. For example:

```
aws sns publish --topic-arn arn:aws:sns:us-east-1:739913950676:SASTest
--message "Hello World"
```

This results in the text message "SASTEST> Hello World" being received by any phone numbers subscribed to the topic "SASTest".

² I think I should mention that if you are concerned about security, you can encode your password with PROC PWENCODE.

³ After the first million messages in a given month, additional messages can be sent at the rate of \$1.00 per million messages.

⁴ You do not need to be in the eastern USA to use this service; Amazon has simply decided that this is the server this service runs on.

Sending such a message from a SAS program requires the use of the X statement. The X statement (usually referred to as an X command) is used to pass instructions from SAS to the operating system, and is a global statement that can be placed anywhere in a program in the same manner as an OPTIONS or a TITLE statement. By default, running an X command will cause a system window to remain open until 'exit' is entered. In order to avoid this I recommend the use of the NOXWAIT option, which closes the system window automatically. The syntax for the X statement is very simple:

```
X <'command '>;
```

For example, in order to send the same text message as above, I would use the following program:

```
options noxwait;  
x 'aws sns publish --topic-arn arn:aws:sns:us-east-  
1:739913950676:SASTest --message "Hello World";
```

This has the same result as if you had sent the message directly from the SNS command line interface.

It should be noted that the X statement is a declarative statement, which is to say that it takes effect at compile time unlike normal executable statements. This means that if you wish to write a program which will send a text message only if certain conditions are met, you will have to use %IF and %THEN macro logic rather than standard SAS code. Otherwise, the X command would be executed before the condition was evaluated.

APPLICATIONS

The ability to send text messages from SAS is ideal for organizations which need to send notifications to large numbers of people based on existing data sets. Additionally, I believe text messages have a great deal of potential to be very useful to programmers in certain environments. For example, SAS jobs which run automatically on a schedule could contain code to notify someone when they run, or if they encounter an error. SAS programs which take exceptionally long periods of time to run might contain code send a message when they have finished. Potentially, text messages could even contain some brief information about the results of the analysis conducted by such a program. If desirable, the program could be written in such a way as to notify multiple people if there is more than one interested party.

CONCLUSION

There is a saying that there are always at least three ways to do anything in SAS. It follows logically that this paper, in covering only two ways to send text messages from SAS, cannot possibly be comprehensive. However, I am confident that the methods described above are useful in a wide variety of scenarios in which you may wish to send a text message from your SAS program. Personally, I prefer to use the Amazon SNS method, since it has fewer “moving parts”. When using the email to SMS gateway, your plans may be derailed by the email client on your computer, or your email server, or your cell provider. SNS requires a bit of setup, but once configured it can be relied upon to work regardless of your cell provider or any software you have installed on your computer. The main advantage to using the email-SMS gateway method is that it occurs inside a DATA step. If you need to send text messages that don't benefit from the power of DATA step code and are located in the USA I recommend looking at Amazon SNS.

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