Mobile Business Applications: Delivering SAS Dashboards To Mobile Devices via MMS

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ABSTRACT

Today's face-paced business environment requires leveraging mobile technology more than ever. In order to conduct business within the mobile space, several delivery platforms have been developed; however one optimal method of delivery is the Multimedia Messaging Service (or picture message). MMS is a cost-effective and platform agnostic solution, simplifying the financial, IT and logistical challenges that are common with mobile integration. Without added cost of development, MMS empowers businesses to push a single graphical representation of data to all necessary recipients, regardless of manufacturer (iPhone, Andriod) or the technological level of the phone (smartphone, basic phone).

This paper explains how a sales representative of a company learns that her territory has changed while out of the office. From her mobile device she sends a text message to her company's main email address. At the office, a SAS Job receives the text message; the job is then triggered and uses PROC GMAP to generate a map showing the employee's current sales territories and distance to goal. Then the SAS job immediately sends a picture message back to the sales representative's mobile device. The content of the message is the output image from the GMAP procedure and any accompanying text. Using this method, the company's employees can receive SAS graphical output on their mobile devices on demand. The SAS Job also logs how many MMS messages it sends out, to which users and the messages' contents. This data is used for the companies' internal reporting. Sending SAS Graphs of several varieties are discussed in this paper.

INTRODUCTION

Over the past decade, technology has simplified the collection and depth of data, prompting companies to establish data as a central point of their operations as they search for internal and external measures that can generate better returns on their resources. As business analytics and data management becomes more commonplace across industries and markets become more competitive, companies are now focused on the speed, ease and ubiquity with which their data can be accessed as they seek a competitive advantage. Mobile platforms are ideal for meeting these market demands and, in attempt to remain cutting edge, many organizations have either insourced or outsourced App development in order to push data to mobile platforms. However, for the majority of these organizations their needs would be better met delivery SAS ODS Reporting through MMS.

Industry often immediately favors new technology over that which exists. It is for this reason that, despite its increased benefits in cost and relevance, MMS technology is presumed less useful than its newer App counterpart. However, by using SAS ODS reporting through MMS, companies can better serve many of the data management needs they would typically seek from a mobile App. For example, many businesses, desiring on the road updates of accounts, forecasts and sales quotas, have developed or purchased apps that interface with their Customer Relationship Management (CRM) tools. Unfortunately, such solutions are limited in impact and provide limited return on investment when compared to utilizing SAS ODS reporting through MMS. Through tailored, graphical KPIs that a user can receive in response to a text from any mobile device, SAS ODS Reporting through MMS extends its corporate value over traditional Apps by excelling in cost and relevance.

Although mobile data access is becoming standard, the number of devices with which individuals can access that data is continuing to expand. Driven by a projected annual growth rate of 38%, the major four operating platforms- Android, iOS, Windows and Blackberry- are expected to see reduced share as new companies enter and phone manufacturers vertically integrate. While good for end consumers, this degree of platform diversity means difficulties and increased costs for the companies who wish to utilize App development to streamline internal processes or provide options to customers. Whether insourced or outsourced, App development is costly. Prices of App development range from $12,000 to $150,000 per platform. Companies who intend to provide access to data for all

employees or consumers are inclined to develop apps across all platforms, each requiring updates and management in order to remain beneficial. Such necessary costs and oversight reduces the return on investment- whether through use of resource capital or additional sales- that providing this access produces. Unlike developed applications, managing SAS Reporting through MMS is platform agnostic, offering the opportunity to access near real time data from a single development build. By untethering data from platform specific apps, SAS MMS Reporting is more adaptable to technological trends and better suited for industries poised to see high levels of growth, such as the mobile smartphone industry. Companies leverage MMS based solutions should also see other benefits.

Mobile Apps, despite their undeniable convenience, can be excessive for the needs of organizations and their consumers. Apps are designed to meet a wide audience and thus often consist of a variety of functions that might not be necessary to the immediate and specific needs of the user. Designing layered functions that meet the demand of all users might result in programs that are unnecessarily large and slow. In a world that expects data on demand, users do not expect to exchange convenience for immediacy, nor should they. Thus a market opportunity exists to utilize SAS Reporting through MMS. SAS MMS Reporting allows mobile users to ping a server with the data they request and, in response, receive a nearly instantaneous visual display without tedious navigation or frustrating idle times. Moreover users, whether business or consumer, can tailor request terms to meet their specific demands and thus provide a custom experiences that meets a market of one.

SENDING TEXT MESSAGES FROM SAS

Most people believe that text messaging is something that came about with the dawn of mobile devices. However this is not the case, sending text messages via mobile devices is no different than sending an email from one computer to another. However instead of the intended recipient email address being ‘anybody@company.com’; when sending a text message the intended recipient is ‘phonenumber@provider.com’. As an exercise, the reader of this paper could send an email to his or her phone from their computer. In order to do this, create a simplistic email using your computer; star addressing the email with the appropriate parameters. Depending on what cell phone service provider the intended recipient has, each address will be different. A list of what the email address you might be looking for can be found here:

http://en.wikipedia.org/wiki/List_of_SMS_gateways

E-mailing from SAS is nothing new. For review, one can read the section titled “Sending E-Mail from the DATA Step” at this Web page on support.sas.com:

http://support.sas.com/documentation/cdl/en/hosto390/61886/HTML/default/viewer.htm#a001412669.htm

As shown in the documentation above, the SAS Programmer can send emails via the data step. Therefore, by placing the intended recipient’s phone number with the appropriate gateway one can send a text message to a phone via a SAS Program!

SENDING PICTURE MESSAGES FROM SAS

Sending picture messages is based on the same technology as sending text messages. It is achieved by simply sending an email. However what makes a picture message different from a text message is the fact that there is an attachment on the message. That attachment is the actual image that the sender wants to send to a mobile device as a text message. In this paper, the image type is a .png file. Once again, the ability to send an email from a SAS Program is nothing new. However now what the programmer needs to do now is send an email with an attachment. Instructions on how to do this are also on the support.sas.com page listed above.

The good news for the SAS Programmer is that any SAS graphical output can be saved in the form of a png file. Hence if a programmer needs to send an email (or in this paper’s case a text message) with an attachment of a SAS Graph the steps to achieve this are relatively simple. First the programmer must have a program which will generate the desired graphical output. Next, using ODS the programmer can then send the resulting graph to a png file on

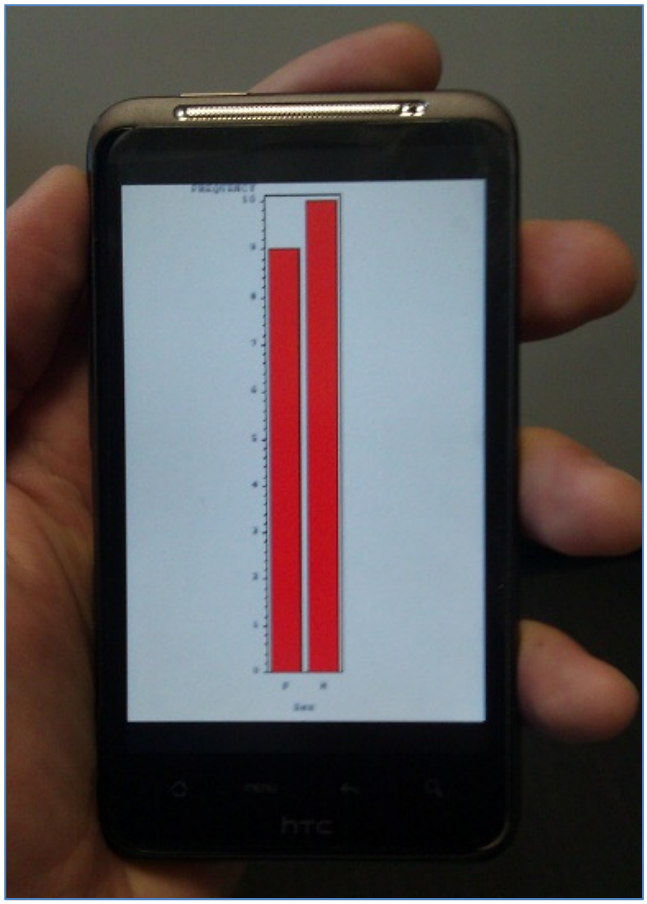
his/her file system (eg: graph.png). After this, the programmer simply executes a data step which will send an email WITH the file graph.png attached to the message.

EXAMPLE: SIMPLE BAR CHART

For demonstration purposes the code to achieve what is described above is below. In this example the programmer generates a graph from the sashelp.class dataset. That image is sent to a location (C:\temp) and named graph.png. Then the datastep email procedure is used to send the image as an attachment.

```
/*SET THE OPTIONS FOR THE OUTPUT*/

%let name=graph;
FILENAME odsout 'C:\temp';
goptions xpixels=480 ypixels=300 device=png noborder cback=white;
ods listing close;
ods HTML path=odsout body="&name..htm" style=minimal;
title;
footnote;

/*GENERATE THE GRAPH*/

Proc gchart data=sashelp.class;
      Vbar Sex/ name="graph";
run;
ods html close;
filename reports email "Anybody@company.com"
replyto= ("Anybody@company.com")
FROM= "Anybody@company.com"
ATTACH="C:\temp\graph.png";

/*SEND THE EMAIL WITH THE IMAGE ATTACHED*/

data _null_;
   file reports;
   put '!EM_SENDER!' 'Anybody@company.com';
put '!EM_TO!' "1234567890@vendor.com";
   put '!EM_SUBJECT!' 'Students Gender Frequency';
      put '!EM_SEND!';
      put '!EM_NEWMSG!';
      put '!EM_ABORT!';
run;
```

Running the code above results in the mobile device receiving the SAS Graph Generated Image (shown in the screenshot below):



As described before, this data step email feature can be used to send a picture message to a mobile device, with the picture message being the graph.png that was generated via the GCHART statement. The result is SAS sending a picture message which is SAS output to a mobile device.

AUTOMATION

The example above shows how a generate analysis, and then distribute analysis to recipients via MMS Messaging. More so, since we already know a text message is nothing more than an email, the potential for OnDemand MMS messages are possible. The next question becomes how to automate the process so when they need an MMS message with SAS analysis they can send a request to the SAS System and get the information needed back. This is achieved by SAS job scheduling.

An individual in the field can send a text message to an email address with the text “Send MMS Report”. The programmer could have a SAS job imports the programmer’s outlook inbox. (the method for how the programmer can import an outlook inbox can be found in the excellent paper: Data in Your Inbox? Use it! – See the references section for more information). The program then generates a dataset of all the programmer’s emails. It then and does a PROC COMPARE with a local copy of the data set. If the results of the PROC COMPARE show that there is a new record in the inbox (that contains the text “Send MMS Report” that doesn’t exist on the local copy of the data set, the SAS program will execute the code from the example above. This results in the MMS message being sent to the recipient(s). After which the program will replace the local copy of the “outlook inbox” data set with the version of the data set that was imported at the onset of the job.

EXAMPLE FROM ABSTRACT

This paper’s abstract explains a use case of a company’s employee in the field. The employee receives information that his sales territory has changed. He therefore would like to receive on his mobile device a map which shows all of his current sales territories along with text about which new areas he has to cover. For demonstration purposes we

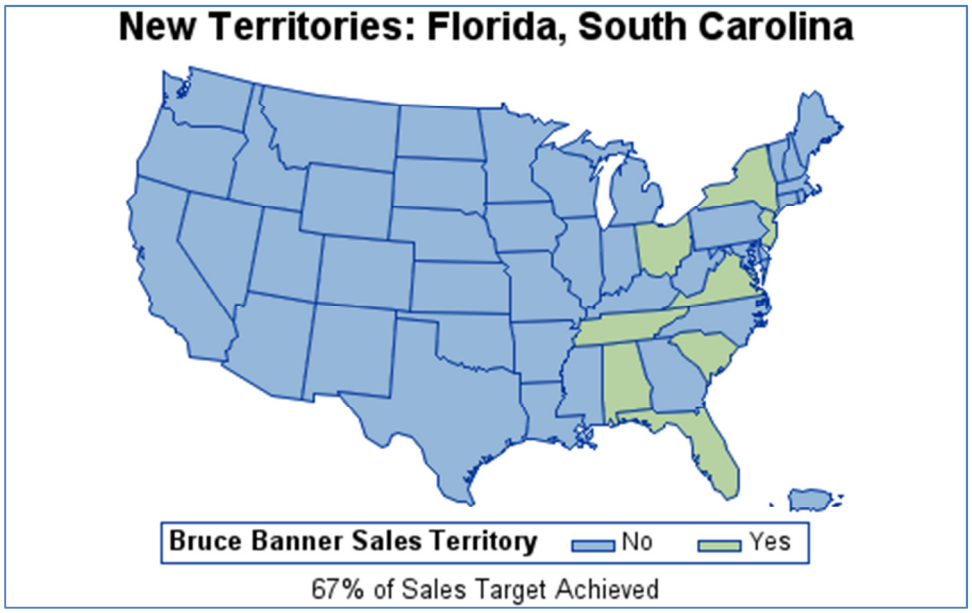
will assume the employee's name is Bruce Banner and he works for Anycompany.com. Bruce's email address is "Bruce.Banner@anycompany.com" and Bruce's mobile phone number is "1234567890@carrier.com." The end to end procedure for how Steve will the needed information to his mobile device, OnDemand via MMS is as follows:

First, Bruce Banner receives a text message on his phone that states "Two new states have been added to your sales territory." At this point Bruce wants to receive more information about his new territory. From his mobile device, he sends a text message addressed to "Bruce.Banner@anycompany.com" with the contents "Send Territory Map" as the actual message text.

The text message is received in Bruce's outlook inbox as an email. Bruce's computer has a SAS job which imports his outlook inbox every minute. Immediately after Bruce's email is received the SAS job runs on its next scheduled run. It discovers (via PROC COMPARE) that a new request for an MMS message has arrived within the last minute; also the program knows that the report request is for a territory map because the text from the email/text message states "Send Territory Map". Using conditional execution logic the program now executes the generation of a territory map via the code below.

```
ods listing close;
FILENAME odsout 'C:\temp';
goptions xpixels=480 ypixels=300 device=png noborder cback=white;
ods html path=odsout body="&name..htm"
      style=normal;

legend1 label=("Bruce Banner Sales Territory")
             value=(t=1 j=l "No" t=2 j=l "Yes") frame;
/*goptions device=png;*/
                    title 'New Territories: Florida, South Carolina';
                                          footnote "&Distance of Sales Target
Achieved";
proc gmap map=cus_map(where=(state ^in(2, 15))) data=stores;
     id stateabbrev;
     choro Territory /discrete missing name="graph"
     legend=legend1;
     run;
quit;
ods html close;
ods listing;
```

The code above creates the following image:



Now the program will email the image as an attachment to Bruce's mobile device. It will be received in the form of a MMS message.

```
filename reports email "Bruce.Banner@anycompany.com"
replyto= ("Bruce.Banner@anycompany.com")
FROM= "Bruce.Banner@anycompany.com"
ATTACH="C:\temp\graph.png";

/*SEND THE EMAIL WITH THE IMAGE ATTACHED*/

data _null_;
   file reports;
   put '!EM_SENDER!' 'Bruce.Banner@anycompany.com';
   put '!EM_TO!' "1234567890@carrier.com ";
   put '!EM_SUBJECT!' 'Your Territory Has Changed';

      put '!EM_SEND!';
      put '!EM_NEWMSG!';
      put '!EM_ABORT!';
run;
```

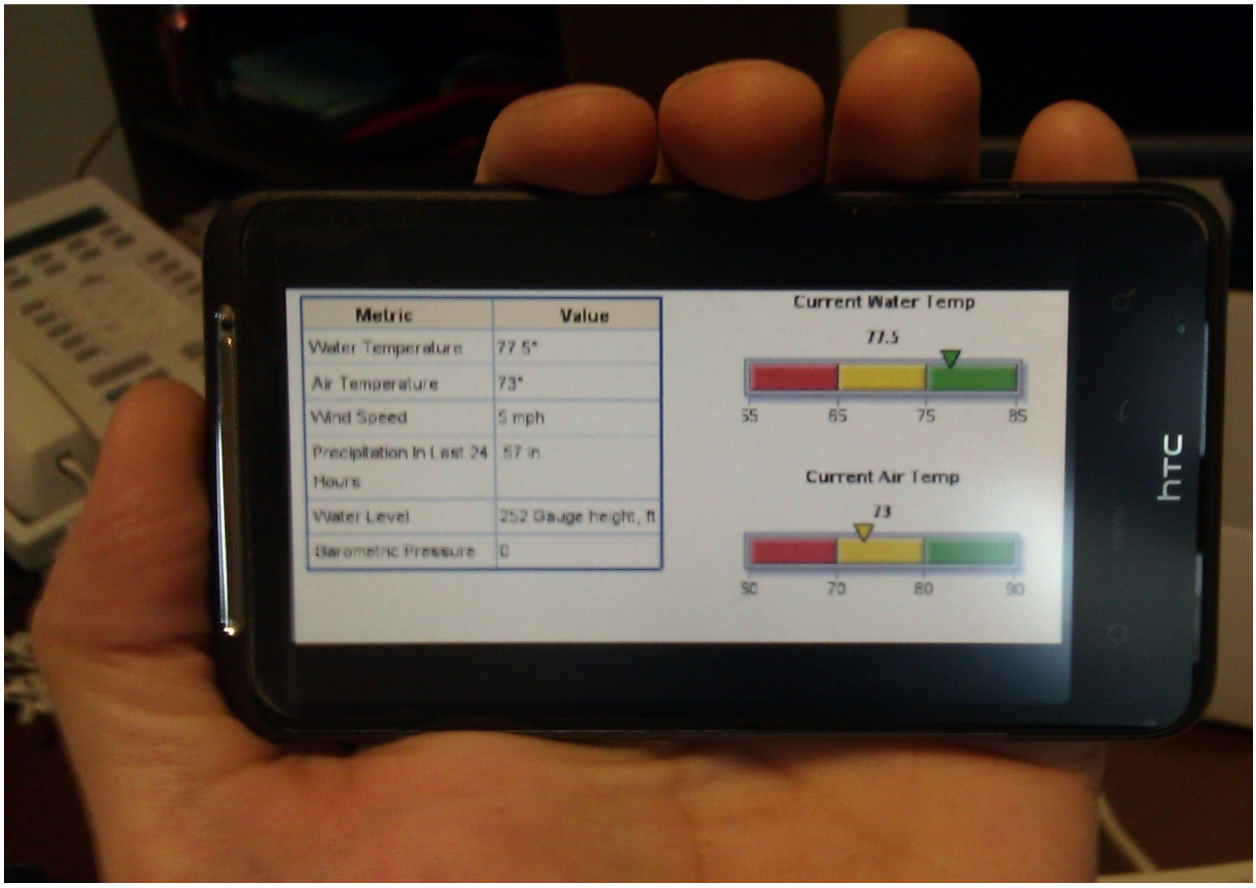
VIA the FILENAME statement above, SAS sends the generated .png image file (located in C:\temp\graph.png) containing the sales territory map as an attachment in an email to "1234567890@carrier.com." Within seconds, Bruce's mobile device receives an MMS message containing the information needed. Bruce reviews the updated map and continues his work in the field. He has now requested SAS analysis from his mobile device and has almost instantaneously received the requested data back.

FURTHER APPLICATIONS

A popular MMS SAS Report message that has been used in the past was to track the water temperature in a lake near Raleigh. Metrics such as temperature and water levels were being tracked by a SAS program. The report users wanted the ability to receive data on multiple metrics at the same time (in several report output varieties).

SAS's graphing capabilities are virtually limitless. More so, to achieve the desired report above procedures such as GSLIDE and GREPLAY can be used to send one image with multiple data points on it to mobile devices. The SAS

Programmer generated a table and a two KPI indicators and GREPLAY-ed them onto a single .png file. Then this was sent to the report viewer's mobile devices. As shown in the screenshot.



End to end, the combination of SAS's excellent graphing capabilities, and the ability to email from the data step empowers the SAS Programmer to be able to send MMS messaging to mobile devices. More so, since we already know a text message is nothing more than an email, the ability for OnDemand MMS messages are possible.

CONCLUSION

The increasing relevance and capabilities of mobile telecom are driving more business units toward managing traditional business responsibilities through mobile devices. While several modern solutions to conduct business on mobile platforms have developed, "Apps" in particular, MMS is an alternate, optimal method of delivery. MMS is a cost-effective and platform agnostic solution, simplifying the financial, IT and logistical challenges that are common with data management over mobile platforms. Without added cost of development, MMS empowers businesses to push a single graphical representation of data to all necessary recipients, regardless of the technological level or manufacturer of the phone. As such, when integrated with SAS ODS Reporting, MMS provides a valuable alternative to the App solution.

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