Electronic Mail Using SAS/AF Software and PROC FSLETTER

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ABSTRACT

Electronic mail is beneficial to a broad range of users. An electronic mail system based on SAS/AF and PROC FSLETTER is easy to implement and has the added advantage of initiating new users to the SAS environment. The purpose of this paper is to provide and describe the code used to implement an electronic mail system using SAS/AF and PROC FSLETTER under NVS/TSO.

INTRODUCTION

The City of Portland Water Bureau has a diverse group of computer users including administration, accounting, engineering, and operations. Electronic mail is a common need of this user base. The Bureau was already using a dedicated word processor, thus making an integrated word processing/electronic mail system, such as PROFS, made in-house implementation practical.

OPTITIVES

The objectives for the electronic mail system were as follows:

1) Capability to write letters.
2) Capability to send letters to one or more other users.
3) A means to inform users that they have received mail.
4) A means to catalog or file letters in an orderly manner.
5) Provide password protection for each user.

PROGRAMMING APPROACH

The developers conferred verbally on code that could be used to meet the objectives of the basic system. No flow diagrams, outlines, plans, etc. were drawn up - instead SAS/AF was used to design and create the primary menu for the electronic mail system. Fast system development using SAS/AF made in-house implementation practical.

DETAILS OF IMPLEMENTATION

The mail system resides in a SAS catalog called MAINCAT. A PROC BUILD invoked on this catalog would yield the following:

DIRECTORY FOR CATALOG; SYSLIB.MAIL

COMMAND ---->

NAME TYPE DESCRIPTION
--- --- -------
C:
CATALOG HELP HELP FOR CATALOG MANAGEMENT 08JUL86
SYSLIB AID HELP FOR SYSLIB MANAGEMENT 08JUL86
EXIT HELP HELP FOR EXIT MENU 08JUL86
SEND HELP HELP FOR SEND 12JUL86
WRITE HELP HELP FOR WRITE 12JUL86
PROC BUILD 26JUL86
PRIMARY MENU 12JUL86
BYODER PROGRAM 12JUL86
PASSWD PROGRAM 12JUL86
FREE PROGRAM PROC BUILD OR MAIL CATALOG 12JUL86
COPYLET PROGRAM 26JUL86
LISTLIB PROGRAM LIST CATALOGS IN LISTING LIBRARY 08JUL86
VIEW PROGRAM 12JUL86
PASSWD PROGRAM 12JUL86
FREE PROGRAM 12JUL86
SEND PROGRAM 26JUL86
WRITE PROGRAM 26JUL86

The programs listed above give the reader an overview of the finished system. The actual order of implementation and the corresponding programs are listed below:

<table>
<thead>
<tr>
<th>Objective</th>
<th>Program(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Design the Primary Menu</td>
<td>PRIMARY.MENU</td>
</tr>
<tr>
<td>2) Implement password protection</td>
<td>FREE.PROGRAM</td>
</tr>
<tr>
<td>3) Write capability</td>
<td>WRITE.PROGRAM</td>
</tr>
<tr>
<td>4) Send capability</td>
<td>SEND.PROGRAM</td>
</tr>
<tr>
<td>5) Read capability</td>
<td>READ.PROGRAM</td>
</tr>
<tr>
<td>6) Catalog management</td>
<td>INBOXALC.HELP</td>
</tr>
<tr>
<td>7) Help</td>
<td>CATMAN.PROGRAM</td>
</tr>
</tbody>
</table>

Following is a description for implementation of each objective:

Design the Primary Menu

The electronic mail system menu was easy to design since the objectives for the system were straightforward. The menu appears as follows:

If the Primary Menu was selected in a PROC BUILD and the ATTE command was given, the result would be the following screen:

With the SYSLIB Library allocated in OLD, the BUILD.PROGRAM can be called from the Mail Primary Menu to add or edit programs.

Implementation of Password Protection

The mail system itself is one option available from a menu called PRIMARY.MENU that is located in a catalog called MAINCAT in a SAS Library referenced by the libref SYSLIB. Selection of the mail system option invokes the PASSWORD.PROGRAM which follows.
**USER FIELD ATTRIBUTES FOR PASSWORD PROGRAM**

<table>
<thead>
<tr>
<th>Field Name</th>
<th>SAS Macro</th>
<th>Type</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pass</td>
<td>SAS Macro</td>
<td>Type</td>
<td>Other</td>
</tr>
<tr>
<td>Name</td>
<td>Name</td>
<td>Non-display</td>
<td></td>
</tr>
</tbody>
</table>

Each mail user is given two SAS libraries named `XXX.LETTERS.SASDATA` and `XXX.INBOX.SASDATA`, where `XXX` represents the initials of the user.

- `XXX.LETTERS.SASDATA` is the library that receives mail and is not password protected - it will be discussed with implementation of Send Letter capability. `XXX.LETTERS.SASDATA` is created with the password PASS using the standard TSO password facilities (refer to the TSO PROTECT command). The Letters Library is allocated by the `ALLOC` procedure.

<table>
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<th>Field Name</th>
<th>SAS Macro</th>
<th>Type</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAT</td>
<td>SAS Macro</td>
<td>Type</td>
<td>Other</td>
</tr>
</tbody>
</table>

The `SEND.PROGRAM` requires the user to enter the catalog name and letter name of the letter to be sent. The user may obtain a list of his `FSLETTER` catalogs by leaving the `LETNAME` user field blank. The user may obtain a list of letters within a certain catalog by leaving the `LETNAME` user field blank. The letter list is generated using the `PROC PRINT` statement.

After the user fills in the appropriate catalog and letter name the user then indicates the recipients of the letter by entering an `X` in the appropriate action fields. The letters are sent using the `PROC PRINT` statement.
preferred over PROC BUILD because of the NODIR option. The TSO SEND command is used with the LOGON option to inform the recipient that he has received a letter from the sender WEXXX.

Implementation of Read Capability

MACRO TSOALC:
Y WEND; IF (LOGON) THEN 'DO;
PROC DISPLAY (C SYSLIB.CATMAIL.MENU): RUN;
Y ELSE;
PROC SEND LETTER-LETTERS.INBOX: RUN;
Y PROC FREE(LETTERS.INBOX): RUN;
Y PROC DISPLAY (C SYSLIB.CATMAIL.MENU): RUN;
Y WEND;
Y WEND TSOALC;

A sender attempting to access this Inbox will be sent to the Inbox Busy Panel.

To allocate the user's Inbox Library, copy the option. The TSO SEND command is used with the and free the Inbox Library. During this time, the Inbox Library is not available to receive letters. The first action of the READ. PROGRAM is to Library, delete the contents of the Inbox Library, and return to the SM Mail Primary Menu.

The implementation of the READ. PROGRAM is to allocate the user's Inbox Library, copy the letters into the Inbox catalog of his Letters Library, delete the contents of the Inbox Library, and free the Inbox Library. During this time, the Inbox Library is not available to receive letters. A sender attempting to access this Inbox will be sent to the Inbox Busy Panel. The letters that were copied into the Inbox catalog of the Letters Library are read using PROC FOLETTER. Before exiting this procedure, the user can delete those letters he does not wish to save. The remainder are copied to the Mailbag catalog of the Letters Library. The Inbox catalog is then deleted, ensuring that it will contain only new letters the next time it is read.

Implementation of Catalog Management

The Inbox or Mailbox is in use. To resubmit Press F15 To Cancel Send Press F19

MASTERS READS:
Y WEND TSOALC;
Y WEND TSOALC;

The Inbox Busy Panel

The Inbox for Mailing is in use.

To re-submit Send Press F15
To Cancel Send Press F19

User Field Attributes for BOXBUSY.PROGRAM

FIELDNAME SAS MACRO TYPE OTHER
Mailing Char Protect

By the time the sender resubmits the letter through this panel, the Inbox copying procedure should be complete. A second failure probably indicates a serious error and the BOXERROR. PROGRAM is invoked. When the sender ends out of this panel, execution of the SEND. PROGRAM resumes.

INDEX EDGER PANEL

There is a problem with the Inbox for mailing:
Letter cannot be sent
Please contact the SAS Site Consultant
Press F19 to Continue

User Field Attributes for BOXERROR.PROGRAM

FIELDNAME SAS MACRO TYPE OTHER
Mailing Mailing Char Protect

It is also possible that a user will attempt to read his mail while a letter is being sent to his Inbox Library. In that case, INBOXALC.HELP will be displayed.

600
PROC DATASETS LIBRARY-LETTERS MT-CAT;
DELETE CATNAME;
RUN;
PROC DATASETS LIBRARY-LETTERS MT-CAT;
CHANGE TEMP=CATNAME;
RUN;
$CATNAME;
PROC DISPLAY O=STYI$.MAIL.PRIMARY.MENU;
RUN;

User Field Attributes for CATMAN.PROGRAM

FIELDNAME SAS MACRO TYPE OTHER
Catall Catall Name
Catl Name
Catl8 Name

In the READ.PROGRAM, all incoming mail to be saved was sent to the Mailbag catalog. The CATMAN.PROGRAM is used to sort the contents of the Mailbag into other catalogs the user has created in his Letters Library. It can also be used to redistribute the contents of those catalogs.

Before copying or moving letters the user may wish to check for duplicate letter names in the source and destination catalogs. The rename command of PROC FSLETTER is used to correct duplication. It should also be noted that renaming a letter to nothing (a blank space), is a convenient method of deleting letters.

To move or copy letters, the contents of the source catalog are displayed one screenful (15 letters) at a time. A destination can be selected for each letter.

To delete letters from the source catalog the MOVELET.PROGRAM is selected.

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To Copy Letters Enter Catalog Name

To Copy Letters Enter Catalog Name

To Copy Letters Enter Catalog Name

To Delete Letters Enter Catalog Name

To delete letters from the source catalog the MOVELET.PROGRAM is selected.

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