Maximize Return on a Minimal Software investment: 
Build an Online VIS (Visual Information System) Without SCL 
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Introduction 
Facilities in Base SAS* software can meet online application user interface needs—without more software, more manuals, and yet another language (Screen Control Language, SCL). Base SAS software, its macro facilities (especially %DISPLAY and %WINDOW), and SAS/GRAPH* software can be used to build a complete online Visual Information System (VIS). 

The VIS permits menu-based, fill-in-the-blanks specification of print destination ID, and selection of "canned" graphs for display or print. 

Such a TUI (Textual User Interface) is simple and easy to use. Yes, users can read, despite the popularity of the overrated GUI concept. 

By "canned" graphs is meant that format and content (but not data) for the graphs are predefined. Presumably, graph formats will remain largely unchanged from run to run, but not the data. For methods to dynamically autocustomize the details of a graph from run to run—to suit the vicissitudes of data and/or date while enforcing graph design standards—see my prior paper "Software Intelligence: Applications That Customize Themselves", on pages 114-122 of Proceedings of the Eighteenth Annual SAS Users Group International Conference, SAS Institute Inc. (Cary, N.C.), 1993. 

For a VIS whose graphs are displayed and/or printed by many users, one might expect resource saving and response-time reduction by running a batch job once to load the graphs into a catalog, and permitting online users to replay them via non-interactive invocation (under the covers) of PROC GREPLAY. However, my experimentation revealed that catalog-loading takes a small portion of resources, but replaying to a device takes a large portion—so that benefits are probably small or non-existent. In any case, full-screen-mode PROC GREPLAY, which might be considered an option by some application developers, is not a convenient alternative to a custom VIS. 

If graph creation requires a lot of up-front "number-crunching", that can have a big impact on resources and performance. But the right solution is to do number-crunching in a preliminary, one-time batch job (rerun based on the reporting cycle), to create the final input files for the graphs. 

Complete code for a VIS prototype is furnished. It can readily be adapted—after the chart selection list, point the VIS at your graph programs, and customize the print-support code for your device and network. 

The VIS prototype was developed and tested with SAS Release 6.08 on MVS TSO. I believe it to be reliable, but can offer it only "as is". If adapted by you, the prototype must be adjusted by you for your environment, and must be tested by you to verify acceptability and correctness of results. 

On the following pages are the commented program code (meant to be self-explanatory), and exhibits of the Printer ID and Chart Selection windows. During the presentation of this paper, sequences of actual terminal screen prints demonstrate use and operation of the VIS, and the effect of the controlling program statements. 

This paper assumes an understanding of SAS macro processing in general, and merely presents, rather than explains, use of the %DISPLAY and %WINDOW macros. For more information, please see SAS Guide to Macro Processing, SAS Language: Reference, and SAS Language and Procedures: Usage 2, all published by SAS Institute Inc., Cary, North Carolina, USA. 

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VIS Program Code

/* ********** start of VIS Prototype program ***********************/

%Macro VISPROTO;

/* ********** define the Printer ID window *********************** */
%Window Printer
#01 "Default printer ID is"
    Defid Protect=Yes
#03 "To override, type another ID of form U9nn"
#04 "Where nn is appropriate two digits"
#06 "Desired printer ID =>"
    Prtid 4 Required=No Autoskip=Yes
#08 "Press Enter to continue";

/* ********** pass default Printer ID as global variable ********** */

/* ********** permit override of default Printer ID ************** */

%let Defid = &Defaulti;
%let Display Printer;

/* below, Prtprep is site-specific macro for printer setup */
%if &Prtid eq
    %then %Prtprep(Prtdest=&Defaulti);
%else %do;
    %local Mprtid;
    %let Mprtid = %upcase(&Prtid); /* translate to uppercase */
    %if %substr(&Mprtid,1,1) ne u
        or %substr(&Mprtid,2,1) ne 9
        or %substr(&Mprtid,3,1) lt 0
        or %substr(&Mprtid,4,1) lt 0
        %then %do;
            %let Sysmsg = ID must be of form U9nn; /* set error message */
            %goto Printer;
        %end;
    %else %prtprep(Prtdest=&Mprtid); /* OK, do setup with override */
%end;

/* ******************************************************* */
/* ********** define the Chart Selection window ************ */
%WINDOW SELCHART
01 $2 "Select desired Chart"
02 $2 "Type D for Display"
03 $2 "or P for Print"
04 $2 "or Q for Quit"
05 $2 SELECT1 1 REQUIRED=NO AUTOSKIP=YES
06 "Chart 1"
07 $2 SELECT2 1 REQUIRED=NO AUTOSKIP=YES
08 "Chart 2"
09 $2 "Then press Enter";
/* ********** get the user's Chart Selection ************ */
%SELCHART:
%DISPLAY SELCHART; /* display the SelChart window */
%LOCAL MSELECT1;
%LOCAL MSELECT2;
%LET MSELECT1 = &SELECT1; /* translate selection indicator */
%LET MSELECT2 = &SELECT2; /* to upper case */
%IF &MSELECT1 EQ Q OR &MSELECT2 EQ Q
%THEN %GOTO EXIT; /* Q means Quit */
%ELSE
%IF &MSELECT1 NE AND &MSELECT2 NE
%THEN %DO;
%LET SYMS = Select only one Chart; /* set error message */
%GOTO SELCHART; /* re-display the SelChart window */
%END;
%ELSE %DO;

%LOCAL CHARTID;
%LOCAL DEVTYPE;
%IF &MSELECT1 NE %THEN %DO; /* 1st entry in list was selected */
%IF &MSELECT1 EQ D OR &MSELECT1 EQ P
%THEN %DO;
%LET DEVTYPE = &MSELECT1; /* pass it on for later use */
%LET CHARTID = 1; /* & the chart program ID */
%END;
%ELSE %DO; /* selection value was invalid */
%LET SYMS = Selection Code invalid; /* set error message */
%GOTO SELCHART; /* re-display the SelChart window */
%END;
%END;
%ELSE
%IF &MSELECT2 NE %THEN %DO;
   /* 2nd entry in list was selected */
      %IF &MSELECT2 EQ D OR &MSELECT2 EQ P
         THEN %DO;
            /* selection value was valid */
            %LET DEVTYPE = &MSELECT2;
            /* pass it on for later use */
            %LET CHARTID = 2;
            /* & the chart program ID */
            %END;
            %ELSE %DO;
                /* selection value was invalid */
                %LET SYMSMSG = Selection Code invalid;
                /* set error message */
                %GOTO SELCHART;
                /* re-display the SelChart window */
                %END;
         END;
      ELSE %DO;
          /* no chart was selected */
          %LET SYMSMSG = Type a Selection Code;
          /* set error message */
          %GOTO SELCHART;
          /* re-display the SelChart window */
          %END;
   END;
   /* *************************************************************** */
   /* ********** specify display or printer GOPTIONS (site-specific) */
   %IF &DEVTVPE = D %THEN %DO;
      GOPTIONS DEVICE=DSPDRVR;
      %END;
   ELSE %DO;
      GOPTIONS DEVICE=PRTDRVR;
      %END;
   /* *************************************************************** */
   /* •••••••••• run the requested chart program •••••••••••••••••••• */
   %INCLUDE "MVSPDS(CHART&CHARTID)";
   RUN;
   /* *************************************************************** */
   /* ********** reset & re-display the Chart Selection window */
   %LET SELECT1 = ;
   %LET SELECT2 = ;
   %IF &DEVTVPE = P
      THEN %LET SYMSMSG = Chart Created for Printer;
      /* Reassure the user that something actually happened. Display would have been visible, but not for processing for a print request. In case print is created, but not released till end of session, this message could be tailored to explain that. */
      %GOTO SELCHART;
   /* *************************************************************** */
   /* * user said to Quit */
   QUIT;
   %MEND VISPROTO;
   %VISPROTO
   RUN;
   /* ********** end of VIS Prototype program */
PRINTER

Command ==> 

Default printer ID is U927

To override, type another ID of form U9nn
where nn is appropriate two digits

Desired printer ID ==> _

Press Enter to continue


SELCHART

Command ==> 

Select desired Chart

Type D for Display
or   P for Print
or   Q for Quit

_ Chart 1
_ Chart 2

Then press Enter