Spec Edit: A Frame Based Application for Managing Revision Controlled Specifications

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Abstract:

Specification limits are an important part of any system that uses PROC CAPABILITY or requires range checking of important process responses. During the development of a product testing data acquisition and analysis system for Ciba Corning Diagnostics, it became apparent that several specification datasets were required. A flexible, easy to use interface was needed to manage the datasets and maintain an audit trail of changes.

SAS/AF frames were used to implement the interface. The frame design and implementation are discussed, as well as possible enhancements.

Biography

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Richard DeVenezia is an experienced programmer and has been a SAS convert since 1990. He is an independent programmer consultant, affiliated with SGS Statistical Services. His specialties include production systems data management and analyses, using FRAME applications to drive programs that utilize a wide spectrum of SAS products. He can often be found on SAS-L lurking for new techniques and occasionally offering some of his own.
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Abstract:

Specification limits are an important part of any system that uses PROC CAPABILITY or requires range checking of important process responses. During the development of a product testing data acquisition and analysis system for Ciba Corning Diagnostics, it became apparent that several specification datasets were required. A flexible, easy to use interface was needed to manage the datasets and maintain an audit trail of changes.

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Introduction:

There are several important concepts that need explaining for a full understanding of a specification database and it's editing.

- A specification database manages data that is organized as such

  spec$_1$ param$_1$
  ...
  param$_{N1}$
  ...
  spec$_K$ param$_1$
  ...
  param$_{NK}$

  Each specification has several parameters associated with it, more than one specification can be stored in a specification database.
- The specification database comprises three SAS datasets that follow a naming convention. A revision control dataset (xxxxxREV), a current specifications parameter dataset (xxxxx) and an obsolete specifications parameter dataset (xxxxxOBS). Hence, a specification database name is restricted to 5 or fewer characters. In this paper the datasets will be called SPECREV, SPEC and SPECOBS.
- SPECREV contains variables *spec, rev, date, time, who, specdesc* and *obsolete*. These variables define the specifications contained in the database and which revision is current.
- SPEC contains variables *spec, rev, _var_, vardesc, _lsl_, _usl_* and *_target_*. These variables define a parameter. SPEC and SPECREV are related by variables *spec* and *rev.*
- SPECOBS contains the same variables as SPEC, the observations are the parameters associated with obsolete specification revisions. SPECOBS and SPECREV are related by variables *spec* and *rev.*
- A specification's revision increases by one when certain items of a specification or parameter within a specification are changed. For this implementation a revision is changed only when a parameter's *_lsl_, _usl_ or _target_* are changed or a parameter is added or deleted to a specification.

  The previous revision parameters are moved from SPEC to SPECOBS and the who and when of the changes are recorded in SPECREV.

Hardware Platform Considerations

The development of the frames was done in SAS 6.08 under Windows 3.1. One of the frames is necessarily wide and is best used in SVGA (800x600) mode or higher. A test port to a UNIX platform encountered no problems.

Macro Variables

A higher level security component of the system controls access to the specification editor and assigns a macro variable *username* when a successful 'login' has occurred. The specification editor was designed to record the 'user' in the variable *who.*

Frames

Three frames were designed; SPECMAIN which is a main menu, SPECINIT which is used once to create a database's underlying datasets and SPECEDIT the meat and potatoes of the application. Each frame can be run independently.

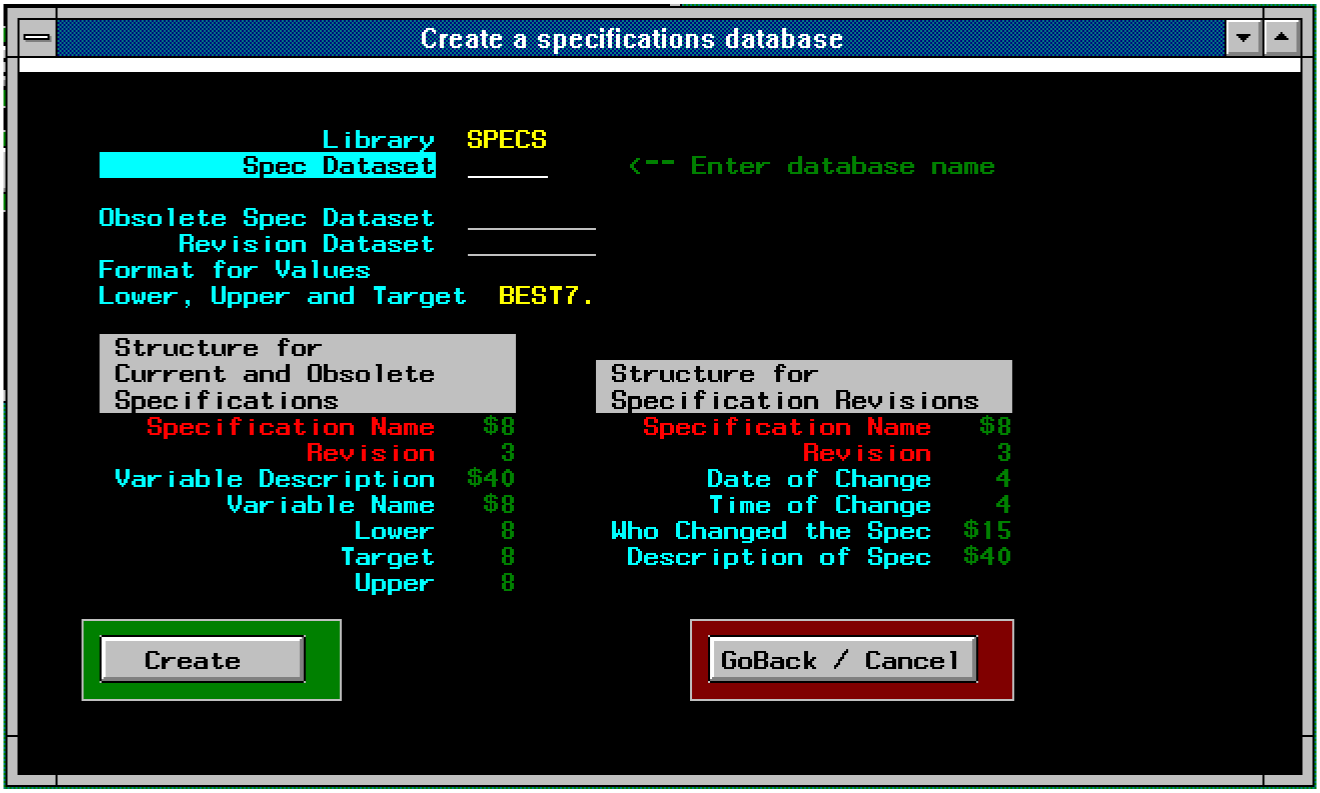
SPECMAIN - Main Menu

A simple frame with two push buttons is displayed:

```
Create a Specifications Database
Edit / Review Specifications
```

Each push button's object name is the same as a frame which is CALL DISPLAYed when the button is clicked.

SPECINIT - Creating a Database



Library SPECS
Spec Dataset ______ <-- Enter database name

Obsolete Spec Dataset ________
Revision Dataset ________
Format for Values
Lower, Upper and Target BEST7.

Structure for Current and Obsolete Specifications	
Specification Name	$8
Revision	3
Variable Description	$40
Variable Name	$8
Lower	8
Target	8
Upper	8

Structure for Specification Revisions	
Specification Name	$8
Revision	3
Date of Change	4
Time of Change	4
Who Changed the Spec	$15
Description of Spec	$40

Figure 1. SPECINIT Frame

Screen fields

There are only two fields that can be modified, the **Spec Dataset** and the **Format for values...** The Library (i.e. LIBNAME) is set to SPECS in this implementation and can not be changed. The obsolete and revision spec dataset names are built from the spec dataset name (i.e. suffixed with OBS and REV respectively).

There is error checking to protect against clobbering an existing database.

The **Create** button initiates a SUBMIT CONTINUE block that creates three datasets with no observations.

SPECEDIT - Editing a Database *(See Figure 2. on next page)*

Requirements of the interface managing specification databases:

- Choose an arbitrary database
- Choose a specification within a database
- Display revision information about a specification
- Display as many parameters of a specification as possible
- Define new specifications or Delete outdated specifications
- Define new parameters, Delete outdated parameters or Reorder parameters
- Print a specification (i.e. it's parameters)
- Display only control objects that are applicable to context (i.e. do not display parameter table if a database has not been chosen)

Laying out the Real Estate

The final screen design was arrived at after several iterations. An emphasis was placed on using control objects that triggered selection lists displayed by the SCL function POPMENU. Several fields can be filled in directly from the keyboard, however, when an error is detected an applicable selection list will be displayed.

An extended table object was used to manage the parameters of a specification.

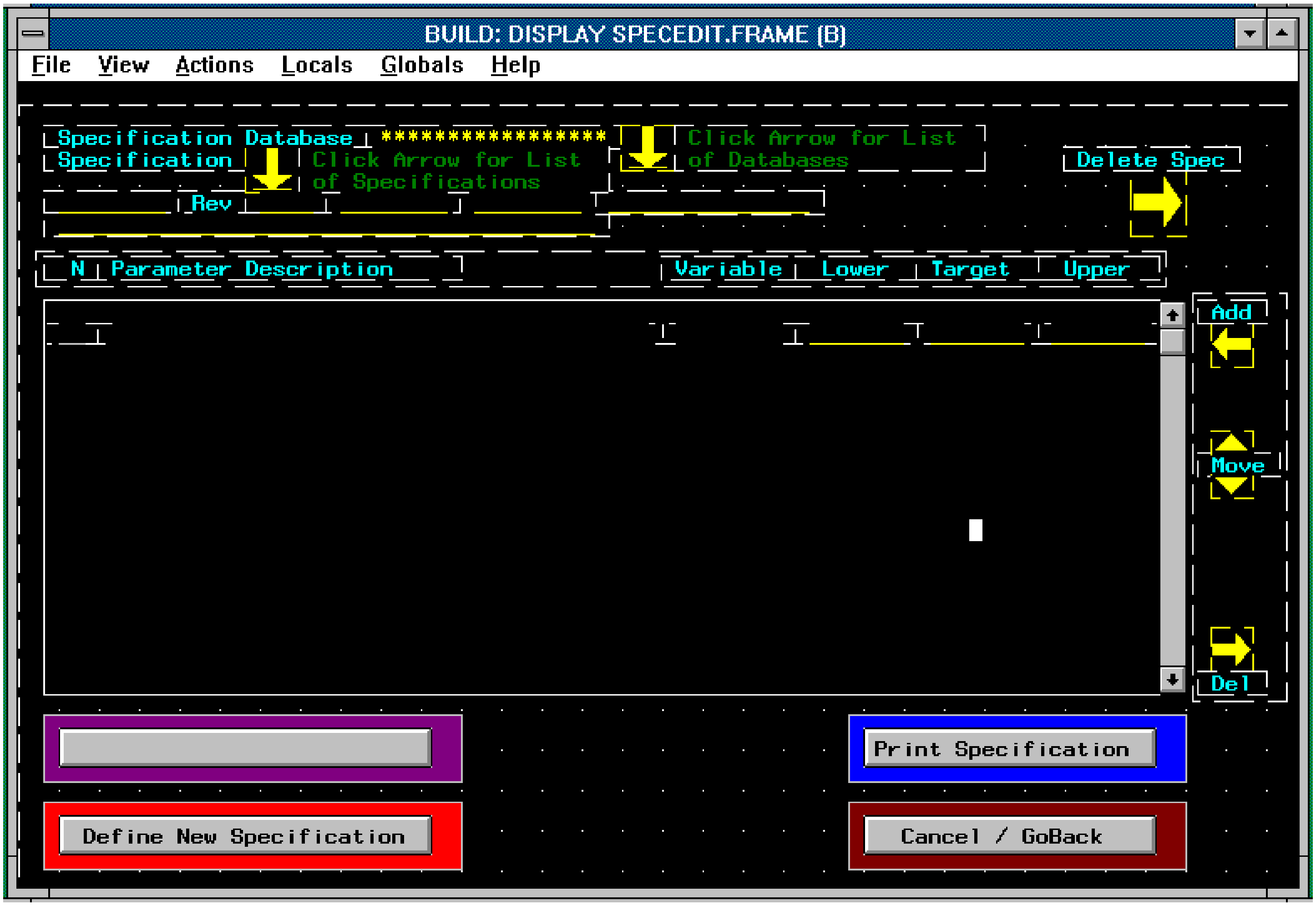


Figure 2. SPECEDIT Frame

Screen fields

Depending on context some control objects are not applicable. Objects that do not apply in a given scenario are hidden using the _*HIDE*_ method.

Specification Database

Type in the name of the database or an '?' to get a list of specification databases to choose from.

Specification Database Arrow

Click on the arrow to get a list of specification databases to choose from.

Specification

Type in the name of the specification or an '?' to get a list of specifications in the database to choose from.

Specification Arrow

Click on the arrow to get a list of specifications in the database to choose from.

Revision, Date, Time and Who

These are 'automatic' fields that can not be edited directly.

Revision is the current revision of the specification.

Date and Time is when the specification was last revised.

Who is the username of the Login which caused the last revision.

Specification Description

This field is directly below the specification name, it can be changed at any time with out causing a new revision.

Delete Spec Arrow

This control object will cause the currently displayed specification to be deleted from the specification database. When it is clicked a prompt will appear 'Delete specification xxxx', if that prompt is also clicked the specification will be deleted.

Parameter Table

This *extended table* displays the current parameters associated with the current specification. It may be scrolled if there are more than 17 parameters.

Each line of the parameter table has several fields

N

A sequence number associated with each parameter. This field can not be edited.

Parameter Description

A 40 character field for a full description of the variable associated with the parameter.

Variable

A variable name that the parameter matches. The variable name matches a variable name in another dataset that will be used in PROC CAPABILITY. This field can only be edited during a new revision.

Lower

The parameter's lower specification limit. This field can only be edited during a new revision.

Target

The parameter's target value. This field can only be edited during a new revision.

Upper

The parameter's upper specification limit. This field can only be edited during a new revision.

Screen buttons

There are four push button objects in this application, depending on context some buttons may not be applicable or may have an extended meaning. _HIDE_ , _UNHIDE_, _SET_LABEL_ and _GET_LABEL_ methods are used to control and interpret context.

Make Changes to Spec

This button will cause a temporary 'new revision' mode in which all user-changeable fields are editable. A full explanation will follow this section.

Define New Specification

Click this button to create a new specification in the specification database. A dialog window will appear asking for the new specification name. Enter a name and accept or cancel with no changes.

Print Specification

Click this button to get a printout of the currently displayed specification. The report will go to the SAS default printer, which is managed by the user.

Cancel / Goback

Exit the screen.

Make Changes to Spec - Edit Specification Mode

Clicking on 'Make Changes to Spec' allows editing of all applicable fields and presents additional controls to the right of the parameter table. Some screen buttons become unavailable or change meaning.

Items 'turned off'

Select a new specification database

Select a different specification

Delete a specification

Define a new specification

Print a specification

Items 'turned on'

Variable

Lower

Target

Upper

Make Changes... button becomes Save / Goback

Add parameter

Move parameter

Delete parameter

Screen fields

Variable

A variable name that the parameter matches. The variable name matches a variable name in another dataset that will be used in PROC CAPABILITY.

Lower

The parameter's lower specification limit.

Target

The parameter's target value.

Upper

The parameter's upper specification limit.

Note

The values for lower, target and upper should be a monotonic ascending sequence. If the values are 'out of order' a prompt will suggest the 'correct' order.

Edit Control Objects

Add

A blank parameter is added to the parameter table by clicking on the add arrow. Fill in the screen fields *description, variable, lower, target* and *upper.*

Del

A parameter is removed from the parameter table by clicking on the delete arrow. A list of line numbers is displayed, click on the line number corresponding to the parameter which is to be removed.

Move

The order of the parameters in the parameter table is changed by using the move before (up triangle) or move after (down triangle). First select the parameter which is to be moved by clicking on it's sequence number in the N column, second click on move before or after. A list of line numbers is then displayed, choose the line where the selected line will be moved before or after.

Screen buttons

Save / Goback

This button will save all changes to the specification. The previous revision will be obsoleted.

Cancel / Goback

Exit the screen with no changes.

Possible Enhancements

Many data analyses use *by processing* which is not supported by this frame. Another extended table to manage specifications according to by variables and their values can be added.

Authors

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