Performance Tester

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Abstract

Have you ever had the occasion to design and build an interactive application only to find the response time lacking? Application users today expect quick response to their queries. Timely delays in returning information may cause you to quickly discard an application that would otherwise have been a useful tool.

Introduction

Performance Tester (PT) is a SAS Software® application that will allow you to perform response time testing using self generated data. Beginning from the Welcome Window (Display 1) a series of menus, allow you to selectively build data sets and run a variety of SAS procedures against the data to automatically produce a report and graphical display of response times. Thus, an application developer is able to equate response times at the terminal to size of data sets accessed and type of output displayed. This knowledge can then be used in constructing production applications that achieve speed requirements.

Also, due to the portability of SAS applications, Performance Tester may be ported to alternate platforms to further gauge performance and help determine machine type and capacity requirements needed to achieve the desired application response times.

PT does not address the many system and design options that are available to the SAS/AF® programmer; rather, it provides a convenient mechanism to make initial estimates of response times. Please refer to the Conclusion section of this paper for reference sources to help improve performance.

Capabilities

This application was written using Release 6.10 of the SAS System for personal computers. Due to the portability of SAS based applications, PT may be ported to a variety of other platforms and operating systems. This option of portability greatly enhances PT's usefulness as a means to evaluate alternative hardware configurations, operating systems, operating system settings, SAS System settings and options for the purpose of selecting a system that will satisfy user response needs.

Performance Tester summarizes process times for simple listing reports. Reports may be generated based on number of variables and observations selected (Display 2). Multiple executions using variations in the number of observations and the number of variables produce an execution time report and time-graphic to help estimate response
time that can be expected in a similar production application.

Likewise, PT is used to produce response time estimates for low and high resolution graphics, sorting and data transfer. After generating output in each of these categories, PT will construct a SAS data file containing observation, variable and run time information. This data file is appended with the results of each succeeding test. After completing multiple tests in one of the above categories, PT will generate a graphical display of the results.

When testing in a category that allows the user to select both number of variables and number of observations, the test results are presented in a three dimensional display. You need only test against data set sizes that span the range of expected size. PT will produce an interpolated set of values across the defined span, and use these values to generate a three dimensional graphic display of the results. This function is performed by the SAS/GRAPH® G3GRID procedure.

Additionally, all graphical output contains a regression equation that models the relationship of execution time to number of variables and/or observations. This regression equation is generated based on accumulated test results in the data ranges of interest.

Performance Tester Design

SAS/AF Submit blocks are used to generate data files for testing.

The code is rudimentary:

```
data rawdata;
  array vars(&novars);
  do i=1 to &noobs;
    do j=1 to &novars;
      vars(i)=i;
    end;
    drop i j;
  output;
end;
```

Execution time for various SAS procedures is recorded and saved using the time function. Times are recorded to the nearest second and saved in a data set. The following code produces the data set 'posttest' which contains test result time for a simple proc print execution. For each test requested the time is appended to posttest.

```
data pretest;
  vars=&novars;
  obs=&noobs;
  start=time0;
  proc print data=wdata u;
  data posttest;
    set pretest;
    time=time()-start;
    drop start;
  end;
```

After completing multiple tests using data set sizes and test category of interest, the test results are summarized by pressing the Summary menu button. This causes execution of:

1) The REG procedure to generate a regression model of time as a function of observations and variables.

2) The G3GRID procedure to produce interpolated values for graphing.

3) The appropriate graphical procedure to display results.

The PT test for sorting, generates a data set containing the number of variables requested for testing with the first variable containing random numbers, within the range defined by the observation count. Data set observations are sorted by the random variable. Random integers are easily generated for the data range defined by the screen variable &noobs and variable j:
vars()=int(ranuni(0)*(&noobs-1)+1;

When you select to perform the data transfer test, a selection screen is provided that will allow you to sign on to a remote session. You complete this task by entering a Session ID, Command ID and Script File Name (Please refer to SAS/CONNECT® documentation for an explanation of these terms). After signing on to a remote session you may perform data transfer tests and produce summary results. You will be returned to the sign on screen after exiting the 'Test Transfer Speed' screen, for the purpose of either signing on to another session or signing off the current session.

Display 4 Sign on Screen

PT results are summarized graphically for each test category. As part of the test results, a regression model estimate is incorporated into the titled output. This is accomplished by running Proc Reg against the test data and then incorporating the parameter estimates into a title statement. The compress function is used to remove spaces. Call Symput defines the macro eq to contain the character string which is assigned to the variable prep. Double quotes identify the macro in a title statement when output is produced.

    prep= compress('Time='round(obs,.0001)"**'obs+'round(vars,.0001)"**'vars'round(intercep,.0001);    call symput("eq",prep);    run;    title "&eq";

Help buttons are provided throughout PT to assist you during execution and the source code well documented for easy modification.

Software

Performance Tester(PT) utilizes several components of the SAS System including Base SAS, SAS/GRAPH, SAS/STAT®, SAS/AF, SAS/EIS® and SAS/CONNECT. Base SAS is used to generate user requested data set, produce reports and execution time statistics. SAS/GRAPH procedures interpolate and display test results. SAS/CONNECT provides the means to communicate with a remote platform for the purpose of analyzing data transfer speeds. SAS/AF and SAS/EIS define the application development environment used to build Performance Tester.

Runtime Performance Tester

Version 6.10 of the SAS System contains a facility to help you create runtime versions of applications. Therefore, a runtime version of PT may be built and executed on a computer that does not have the SAS System installed. This task is accomplished by first using the RTRACE and RTRACELOC options to construct a list of the SAS System files used by PT. The COPYSAS autocall macro is then used to create a batch file that is ultimately used to construct a scaled down version of the SAS System that is able to run PT. PT uses the following files:
You may obtain a copy of Performance Tester by accessing the SAS World Wide Web server at URLHTTP://WWW.SAS.COM/. The application consists of a single SAS catalog and an autoexec.sas file.

**Conclusion**

Performance Tester provides a convenient means to help you perform initial tests to gauge response times. All tests are performed without the benefit of system optimization techniques and therefore represent the slowest response times. Please refer to the appropriate SAS Companion for your operating system for information about performance considerations.

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