PROBLEM DEFINITION

SAS® license of any organization consists of a variety of SAS components such as SAS/STAT®, SAS/GRAPH®, SAS/OR®, etc**.** SAS Administrator do not have any automated tool supplied with Base SAS software to find how many of licensed copies are being actively used.

This paper is trying to help the SAS Administrator to answer the following questions:

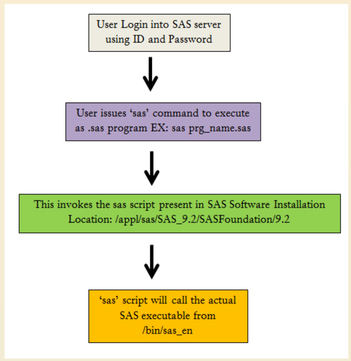
- What are the most used SAS components and what are least used?
- How to identify the most active SAS users and the least active SAS users?
- How many users are connecting to the server in a day/month?
- What are the peak time points of server usage by SAS users?
- How to get the list of inactive SAS datasets for clean-up and space recovery?
- How much disk space is consumed by inactive datasets?

PROPOSED SOLUTION

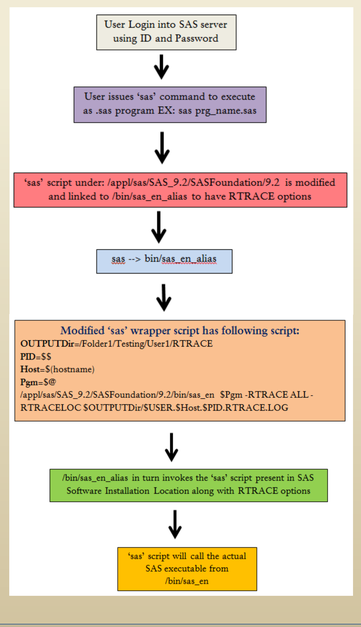
The solution involves the usage of RTRACE option.

- RTRACE is a system option provided by SAS which, if used at the right place, can provide the solutions for the above mentioned questions for SAS Administrator and can record activities of SAS users accessing the server.

Regular SAS Invocation by end user without RTRACE option:



SAS invocation by end user with RTRACE option enabled:



Modified SAS wrapper script

- Modified content of sas wrapper script:

- 1. OUTPUTDir - Will specify the location to which the RTRACE logs should be sent to
- 2. PID - Will capture the process ID of the user
- 3. Host - Will capture the server name in which user was logged in
- 4. "Pgm" refers to the program that SAS user is executing on the server
- 5. call - Command to call to original "sas" wrapper script along with RTRACE option

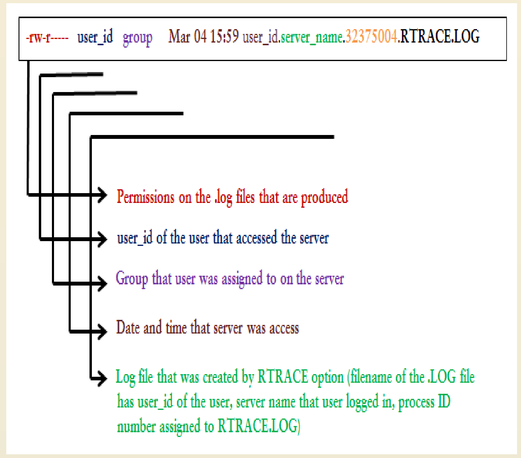
LOGS Produced by RTRACE

When user login and execute a SAS program on the server, RTRACE option invoked by modified "sas" wrapper script will create .LOG file under location /Folder1/Testing/User1/RTRACE mentioned in "OUTPUTDir" variable.
For every user and for every session, new .LOG file will be created under this location.

Example: List of RTRACE LOG's of 2 users accessing the server using SAS 9.2 running on AIX operating system:

-rw-r----- user_id_1 group1 Mar 04 11:28 user_id_1.<server_name>.20316554.RTRACE.LOG
-rw-r----- user_id_2 group2 Mar 04 11:29 user_id_2.<server_name>.15728642.RTRACE.LOG

Understanding of RTRACE Logs



A look inside RTRACE Logs

When we open RTRACE LOG, EXAMPLE: user_id_1.servername.6095048.RTRACE.LOG

We see hundreds of lines with File referenced, File opened, and File closed

File referenced: ../9.2/sasmsg/core.msg
File opened: ../9.2/sasexe/**saswzx**
File opened: ../9.2/sasexe/**saswobs**
File opened: ../9.2/sasexe/**sasxug**
File closed: ../9.2/misc/base/news
File closed: ../9.2/sashelp/core.sas7bcat

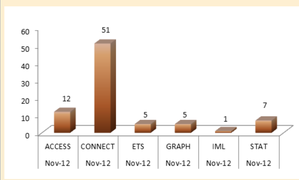
sasxug, saswobs, sasxug refers to the SAS BASE Component that user had opened. Compare these character values (**sasxug, saswobs, sasxug**) extracted from RTRACE logs with the list of .dll values for each SAS Component.

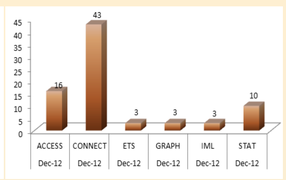
.dll values? What are they ?

- we can't find distinction between various executables installed on AIX server to find .dll values for installed SAS components.
- Windows SAS come to our rescue. Open the SAS Installation directory C:\Program Files\SAS\SASFoundation\9.2
- This has list of all SAS component folders (EX: connect, access etc) and each component subfolder 'sasexe' holds all the .dll files

MOST and LEAST used SAS Components

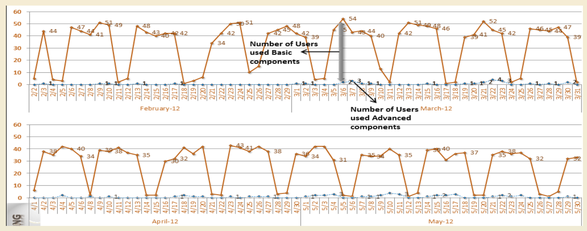
SAS components usage can be traced and understood for every user accessing the server.





Usage of SAS Components with respect to users

When we consider
Basic components as Base SAS, SAS/CONNECT, SAS/ACCESS, SAS/STAT.
Advanced components as SAS/GRAPH, SAS/ETS, SAS/IML, SAS/OR

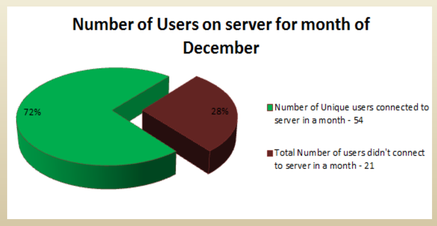


Number of users connecting to the server

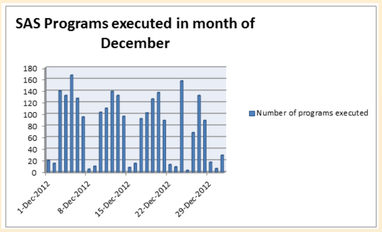
Every time user logins into the SAS server and invokes SAS session, RTRACE will create the LOG file under OUTPUT directory /Folder1/Testing/user1/RTRACE mentioned in the modified "sas" wrapper script.

With this information we can answer following questions:

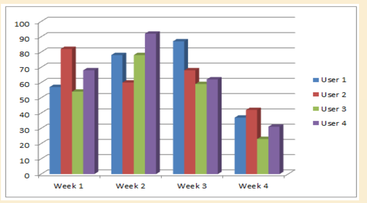
- How many users used SAS server in a day / Week / Month?
- How many SAS programs are executed by each SAS user on the server?
- What is Process ID of the SAS Program running on the server?
- How many times a single user used SAS on a given day?
- What are the peak times of server usage by SAS users?
- Depending on the size of the .LOG file, we can check how long user was referencing / using various SAS datasets located in the server.



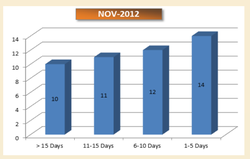
SAS Programs executed during month of December:

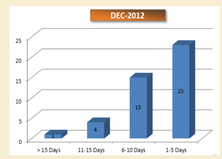


Server usage between 4 users in a month:

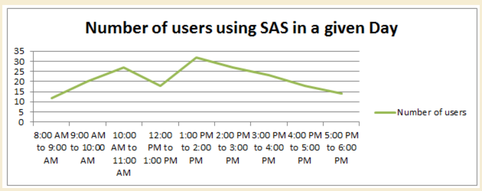


Number of users connecting to the server in a month:





Server usage by users in a given Day:

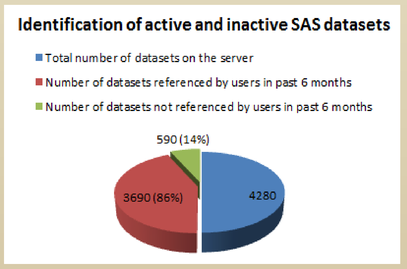


Identification of Inactive datasets

When we open the RTRACE log of individual user from OUTPUT Dir : /Folder1/Testing/user1/RTRACE, we have hundreds of lines giving details of files that were opened, closed, renamed, referenced.
Example:

File opened:
/Project1/Library1/assesment.sas7bdat
File closed:
/Folder1/Testing/user1/align/y2008z2/zip_2008_trd.sas7bdat
File renamed:
/Folder2/Testing/SAS_work3F8D01DB005E_server/afftest.sas7bdat
File referenced:
/Project1/sas/SAS_9.2/SASFoundation/9.2/refer.sas7bdat

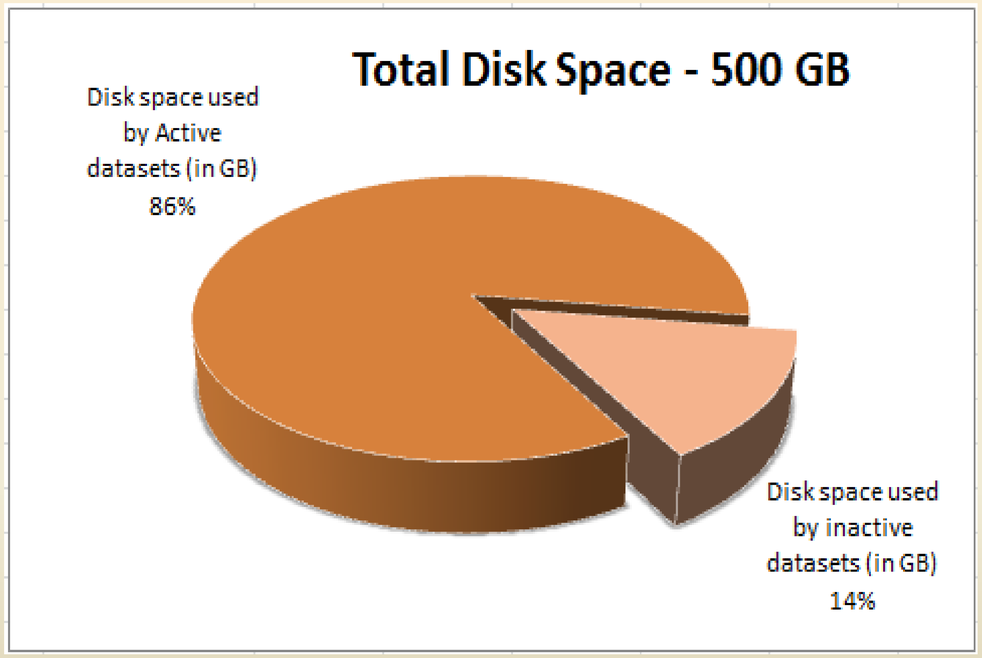
Create a script that gathers all the information about datasets in the RTRACE logs. Extract all the dataset names that were opened, closed, renamed, and referenced by a user or group of users.
Compare this information with the list of all datasets present on the server based on date.



This pic chart indicates that there were total 4280 datasets on the server. 3690 (86%) of them are used in past 6 months and 590 (14%) of them were never referenced by any user.

Calculating Disk Space Usage

- We can extract all the dataset names that are referenced by end users on the server and calculate how much disk space was used to store them.
- Same way, we can calculate the disk space used by inactive datasets that were never referenced by end users in past few months (EX: 6 months).
- This will enable us to take decisions on the amount of disk space needs to be allocated for inactive datasets or we can delete them after consulting with the file owner. This will save us space, time and money.



- In the Fig 15.0 shown above, out of Total disk space 500 GB used on the server, 428 GB (86%) was used by Active datasets. 72 GB (14%) was used by inactive datasets
- Active datasets – Datasets that are referenced in last 6 months
- Inactive datasets – Datasets that were never referenced in last 6 months

CONCLUSION

Using the RTRACE option in modified “sas” wrapper script, we were able to answer the questions we had regarding

- SAS components usage
- most and least active users,
- active and inactive SAS datasets on the server.

Furthermore, we can generate various statistics using the RTRACE information and increase the performance of the server by managing disk space, server resources during the peak usage times, schedule server maintenance, reboots, apply patches etc.

CONTACT INFORMATION

Srikanth Thota
Cognizant Technology Solutions US Corporation
500 Frank W.Burr Blvd, Teaneck, NJ, 07666

Srikanth.Thota@cognizant.com

Airaha Chelvakkanthan Manickam
Cognizant Technology Solutions US Corporation
500 Frank W.Burr Blvd, Teaneck, NJ, 07666

Airahachelvakkanthan.Manickam@cognizant.com

Contact the authors to obtain the complete set of programs that are part of this Administration.