

# SAS® GLOBAL FORUM 2016

IMAGINE. CREATE. INNOVATE.

## Key Requirements for SAS® Grid Users

**Paper 7140-2016**

#SASGF





# SAS GRID Users Key Requirements

Prasoon Sangwan, Tanuj Gupta, Piyush Singh

TATA Consultancy Services Ltd.

## ABSTRACT

Considering the fact that SAS® Grid Manager is becoming more and more popular, it is important to fulfill the user's need for a successful migration to a SAS® Grid environment. This paper focuses on key requirements and common issues for new SAS Grid users, especially if they are coming from a traditional Non-Grid SAS Platform.

This paper describes a few common requirements like the need for a current working directory, the change of file system navigation in SAS® Enterprise Guide with user-given location, getting job execution summary email, incorporating custom scripts with SAS Grid Manager etc.

## Key User Requirement in SAS Grid Environment

**Following Requirements are Explained in this Eposter**

### **SAS Grid:**

1. Current Working Directory with SAS Grid Execution
2. Grid Working Directory Permission Change

### **SAS Enterprise Guide:**

3. Change File Navigation in SAS Enterprise Guide
4. Schedule SAS Jobs through SASGSUB
5. Execute LSF commands through SAS Enterprise Guide
6. WORK vs RMTWORK in SAS Enterprise Guide with SAS Grid

### **Platform LSF:**

7. Default Email Behavior of LSF
8. Multiple Domain User Authorization

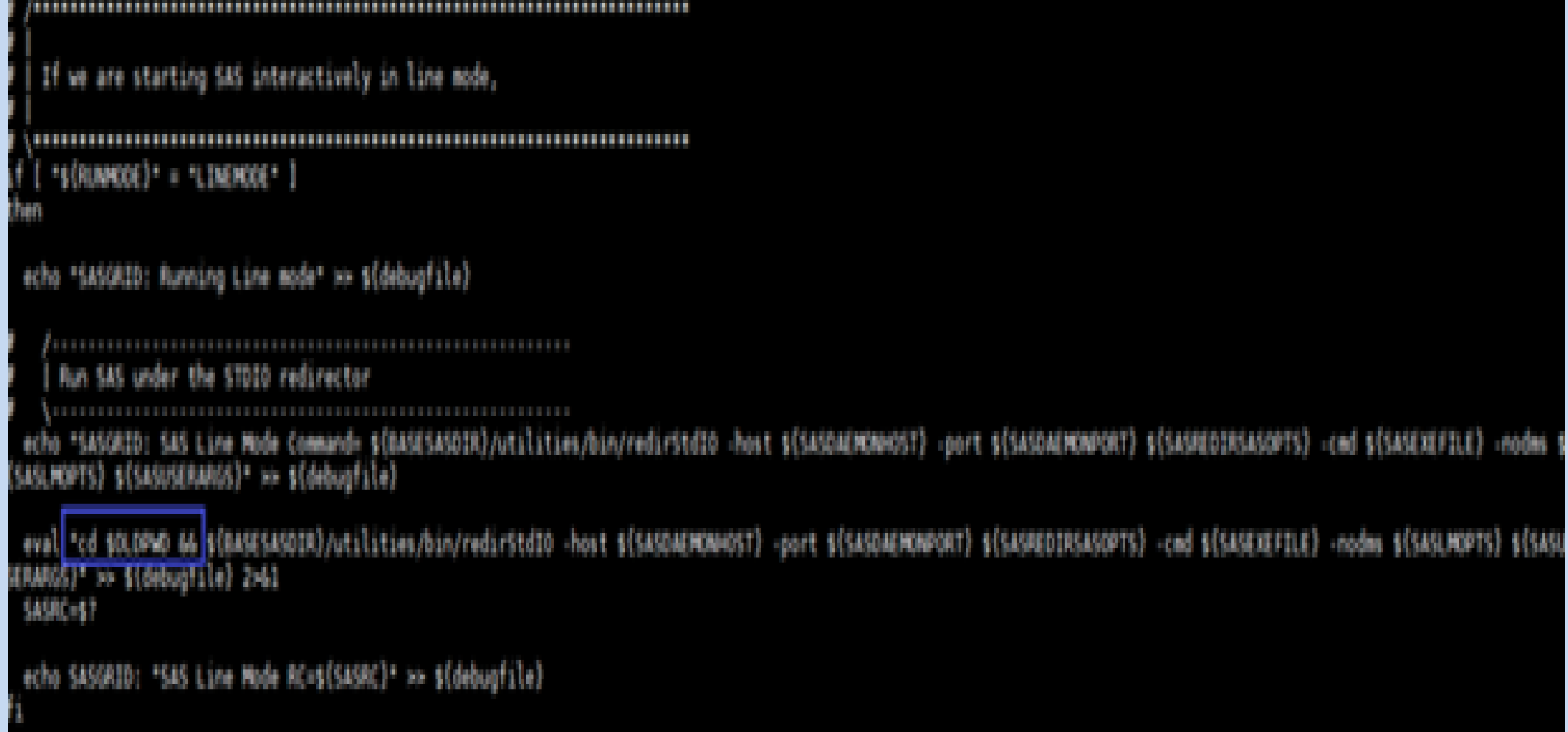
**Note** - For detailed information, please refer the paper: *Key Requirements for SAS® Grid Users - Paper 7140 – 2016.*

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## 1. SAS Grid - Current Working Directory with SAS Grid Execution

Description	Issue	Solution
<ul style="list-style-type: none"><li>In non-Grid SAS environment CWD refers to the location, from where SAS is launched.</li><li>It allows user to read and write any file in SAS code without full qualified location.</li><li>In SAS Grid environment CWD refers to the current working directory is the SASApplication Server home location (where end users have no access to write anything) instead of the location where sasgsub was called from.</li><li>This throws error if user try to read or write without full qualified location. . (Results window Grid SAS)</li></ul>	<ul style="list-style-type: none"><li>When users tries to write a file without absolute path, like below.  Sample Code: <pre>data _null_; set sashelp.cars; file 'test.txt' DLM=', ' ;; put make; run;</pre></li><li>Users will get following error message:  ERROR: Insufficient authorization to access /sasbase/controlserver/sasconfig/Lev1/SASApp/test.txt.</li></ul>	<ul style="list-style-type: none"><li>CWD location is set by the script “sasgrid” located at /sasbase/controlserver/sasconfig/Lev1/SASApp/GridServer.</li><li>1. This script should be edited with OLDPWD environment variable to point to the actual Present Working Directory for “Starting SAS interactively in line mode” in SASGRID script.</li><li>2. OLDPWD environment variable get automatically set in bash shell.</li></ul> 

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## 2. SAS Grid - Change Permission of Grid Working Directory

Description	Issue	Solution
<ul style="list-style-type: none"><li>In SAS Grid environment there are two work directories:</li></ul> <ol style="list-style-type: none"><li><b>WORK</b> - WORK location works in same way as SAS WORK</li><li><b>GRIDWORK</b>.- This contains the log, list and files other than temporary SAS files.</li></ol> <ul style="list-style-type: none"><li>For each SAS job execution, SAS Grid creates a sub directory inside the GRIDWORK location, named as user's system id during the execution of a program.</li><li>User's directory have permission as 755 (world read) causing security problems.</li></ul>	<ul style="list-style-type: none"><li>User's directory under GRIDWORK with 755 permission may lead to security issue.</li><li>User can go to other's gridwork and see the log, sas code etc...</li></ul> <pre>drwxr-x--- 28 zxa9529 sashare 32768 Jan  6 21:40 zxa9529</pre>	<ul style="list-style-type: none"><li>The script sasgrid in SASAppHome/GridServer can be edited to change the directory permission.</li><li>But it's not advisable to make frequent change in sasgrid script all time.</li></ul> <p><b>New Solution in this Paper:</b></p> <ul style="list-style-type: none"><li>UMASK can be added in the sasgsub script to change the user's GRIDWORK directory permission.</li><li>After making the above umask change in sasgsub utility it will create user's gridwork directory like below in /work/gridwork/94:</li></ul> <pre>drwx----- 28 zxa9529 sashare 32768 Jan  6 21:47 zxa9529</pre> <div><pre>[zxa9529@gridclient 9.4]\$ more sasgsub700 #!/bin/sh -p #*      SASGSUB Execution Script      */ umask 077</pre></div>

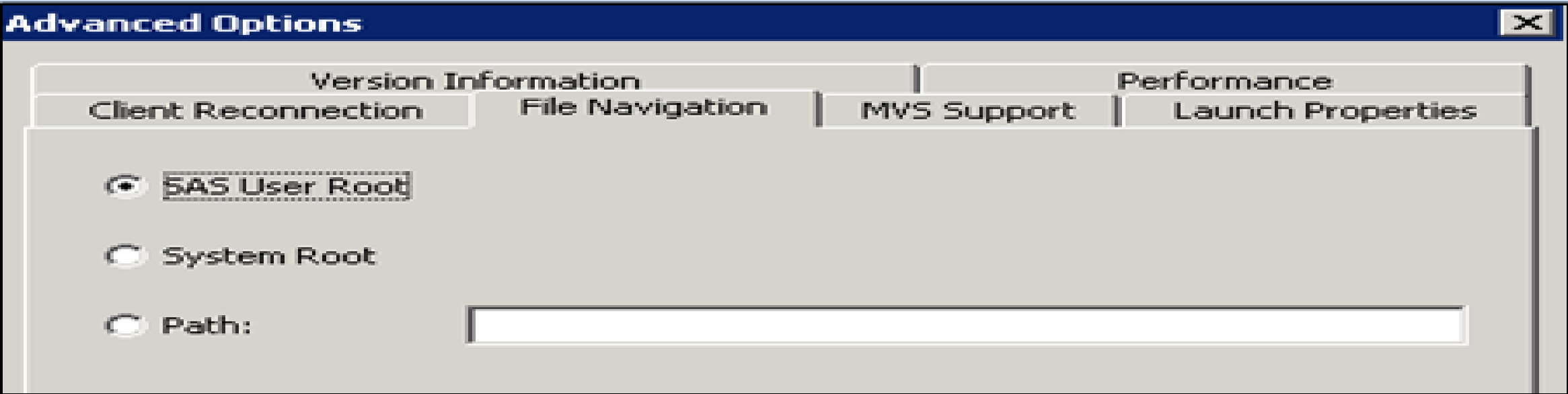

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## 3. SAS Enterprise Guide - CHANGE FILE NAVIGATION IN SAS ENTERPRISE GUIDE

Description	Issue	Solution
<ul style="list-style-type: none"><li>Enterprise Guide creates two default links:</li><li>1. <b>Libraries</b> – When user launches SAS Enterprise Guide, libraries get assigned automatically by SAS.</li><li>2. <b>Files</b> -- is the link where users get the default location to save the files (SAS code, project etc...) on disk storage.</li><li>User should be allowed to change this default (/home/root location) automatically to their desired location.</li><li>Files setting can be changed in SAS Management Console at: SAS Management Console -&gt; Server Manager -&gt; SASApp Server -&gt; SASApp – Logical Workspace Server -&gt; SASApp –Workspace -&gt; Properties -&gt;Options -&gt; Advanced Options -&gt;File Navigation</li></ul> 	<ul style="list-style-type: none"><li>Sometimes business users want to have their own default location for users to start with.</li><li>In this case users would like to see their own storage, attached with “Files” link in SAS Enterprise Guide tree.</li><li>SAS Enterprise Guide creates only two link in AppServer tree. There is no as such any point and click option available in SAS EG for users to change the “Files” link.</li></ul> 	<ul style="list-style-type: none"><li>To make it dynamically assigned by user the “Path” option should be selected under “File Navigation”.</li><li>A macro variable can be assigned to pick up the information dynamically. This can be achieved in following order:</li></ul> <ol style="list-style-type: none"><li>User’s input their desired location in a text file.</li><li>Write a script which reads user’s input variable for “Files” location.</li><li>Call this script (step 2) by SAS Workspace Server script and assign user’s input location to a macro variable.</li><li>This macro variable can be assigned to third option “Path” (given in the description section, left most column).</li></ol>

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## 4. SAS Enterprise Guide - Schedule SAS Jobs through SASGSUB

Description	Issue	Solution
<ul style="list-style-type: none"><li>Three main clients discussed in this paper:<ol style="list-style-type: none"><li>SAS Enterprise Guide</li><li>SAS Display Manager</li><li>SASGSUB</li></ol></li><li>SAS Enterprise Guide is the only client which has direct scheduling capability but it schedules the SAS job at client side. This means, if it gets disconnected from network before scheduled time then job will not be sent to SAS Grid.</li></ul>	<ul style="list-style-type: none"><li>From the clients discussed in this paper, there is no direct client mechanism for user's to schedule the SAS jobs, so that user can schedule the job at anytime to execute at anytime (without being connected to network).</li><li>There is no as such any option available with SASGSUB which can be to schedule the SAS job.</li></ul>	<ul style="list-style-type: none"><li>To use SASGSUB as scheduler, it can be used with "at" Linux utility. "at" will trigger SASGSUB at specified time.</li></ul> <p><b>Sample Command with SASGSUB:</b></p> <ul style="list-style-type: none"><li><code>/sasbase/sasgsubclient/sasconfig/Lev1/Applications/SASGridManagerClientUtility/9.4/sasgsub - GRIDSUBMITPGM test1.sas - GRIDAPPSERVER SASApp   at now</code></li></ul> <div><pre>[zxa9529@gridclient scheduler]\$ ./scheduler Enter SAS program needs to be executed with absolute path : warning.sas  Enter time to schedule the job in format 'Time am/pm mm/dd/yyyy' (Example 10 pm 01/09/2016) :10:27 pm 01/09/2016 job 102 at 2016-01-09 22:27  [zxa9529@gridclient scheduler]\$</pre></div>

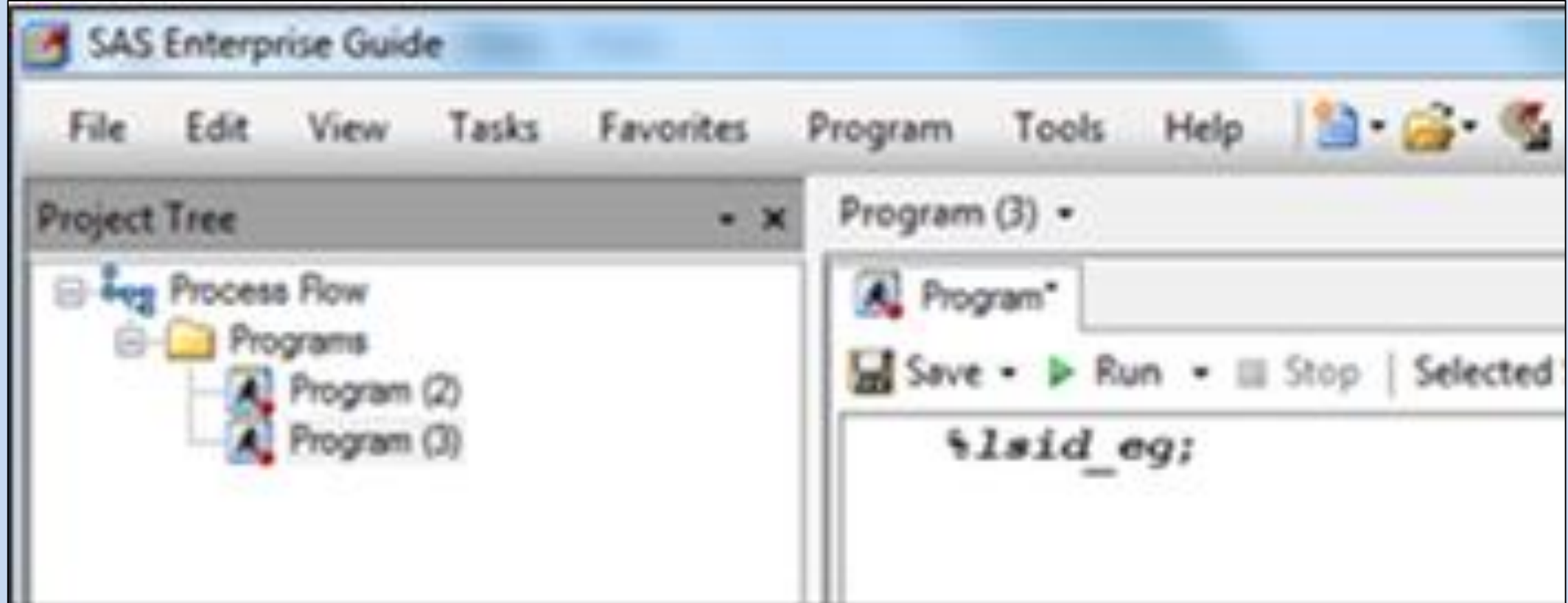
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## 5. SAS Enterprise Guide - Execute LSF commands through SAS Enterprise Guide

Description	Issue	Solution
<ul style="list-style-type: none"><li>How SAS Enterprise Guide user can run the LSF command from Enterprise Guide?</li><li>Sometimes it is not productive for users to run SAS code from SAS Enterprise Guide and then check the job status through Linux command line.</li></ul>	<ul style="list-style-type: none"><li>There is no as such any direct way to run LSF command in SAS Enterprise Guide Session.</li><li>This would be helpful for non-Linux users to run LSF command in SAS Enterprise Guide.</li><li>This would be additional capabilities available for Enterprise Guide users.</li></ul>	<ul style="list-style-type: none"><li>LSF command can be called in pipe with filename statement in SAS code and output can be captured in SAS data set.</li></ul> <p><b>Sample SAS Code for LSF command <i>LSID</i>:</b></p> <pre>filename bhosts pipe "source /sas/platformcomputing/lsf/conf/cshr c.lsf; lsid"; data lsf_info ;     infile lsid truncover;     input SchedulerInfo \$80. ; run;</pre> 

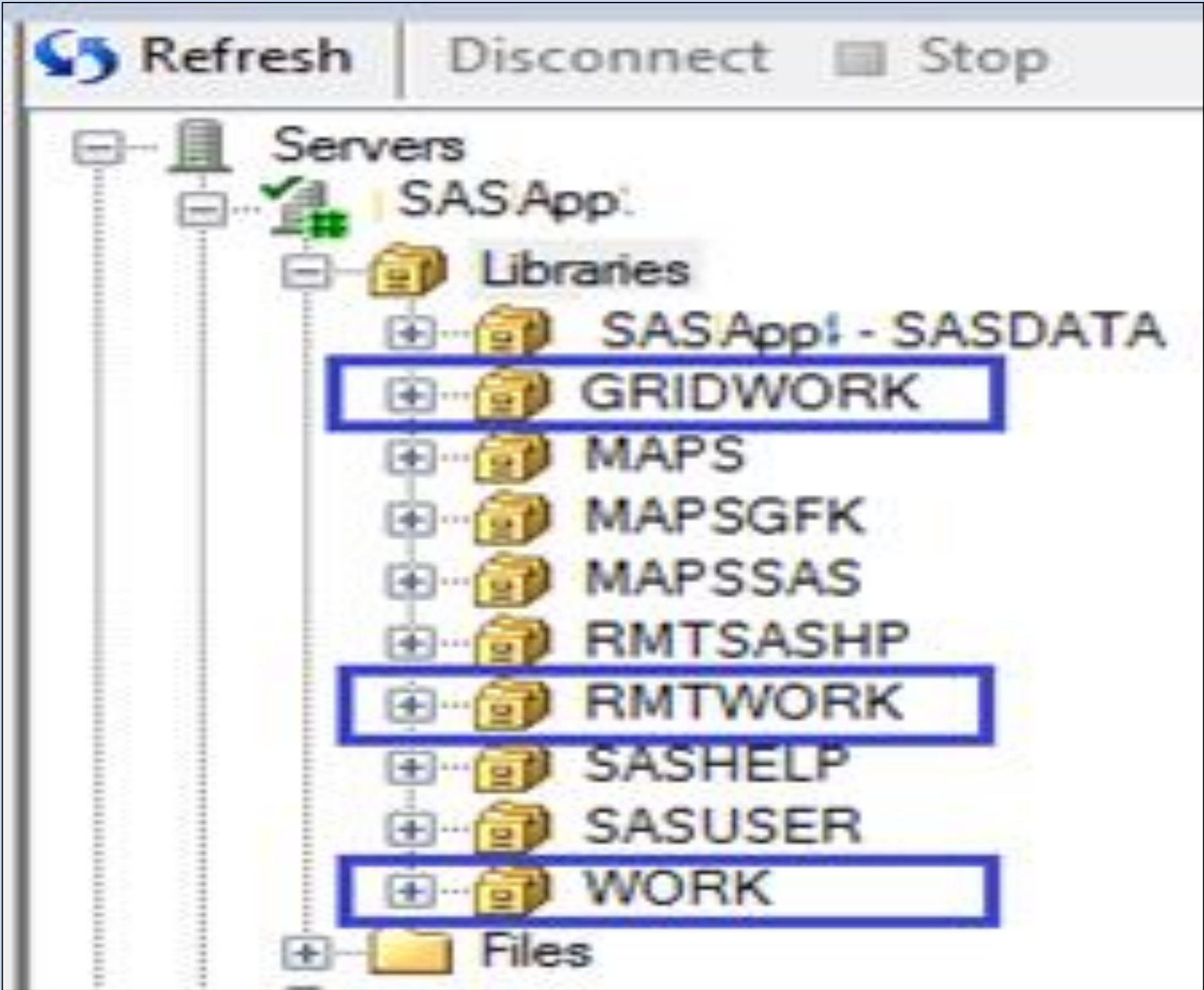

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## 6. SAS Enterprise Guide - WORK VS RMTWORK IN SAS ENTERPRISE GUIDE WITH SAS GRID

Description	Issue	Solution
<p>In SAS Grid, two work directories are displayed in SAS Enterprise Guide:</p> <ul style="list-style-type: none"><li><b>WORK:</b> Once user request get connected with SAS Grid through remote sign-on work library is allocated.</li><li><b>RMTWORK:</b> It is the library where user's temporary files get created when load balanced mechanism selects the least busy server.</li></ul>	<ul style="list-style-type: none"><li>This usually confuses the user when they try to find the temporary files. Also, it takes more time to create two connection and initial communication between two work spaces.</li></ul> 	<ul style="list-style-type: none"><li>Convert the SAS Application Server.to “Grid Launched”</li><li>Converting to “Grid Launched”, will remove RMTWORK from SAS EG Tree.</li></ul> 

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## 7. Platform LSF - DEFAULT EMAIL BEHAVIOR OF LSF

Description	Issue	Solution
<ul style="list-style-type: none"><li>SAS Grid environment works with LSF to execute the SAS jobs. LSF send the email for job information to user's operating system (OS) email account.</li><li>Sometimes user does not want to get the email for each job submitted to SAS Grid.</li></ul>	<ul style="list-style-type: none"><li>Very few users check there operating system email account.</li><li>User needs some conditional input which asks users if they need email confirmation when SAS job finish.</li><li>There is no option available with SASGSUB which can provide the option to user to select whether they want LSF email or not.</li></ul>	<ul style="list-style-type: none"><li>LSB_JOB_REPORT_MAIL is the environment variable which controls the LSF behavior, whether LSF will send job information to user or not.</li><li>LSB_JOB_REPORT_MAIL variable can be set in SASGSUB script before invoking SAS for execution.</li><li>SASGSUB can be modify to provide user input for LSB_JOB_REPORT_MAIL, during SASGSUB execution.</li></ul> <div><pre>[zxa9529@gridclient 9.4]\$ ./gsubemail -GRIDSUBMITPGM /home/zxa9529/staging/warning.sas Is email required (y/n)? n . . .</pre></div>

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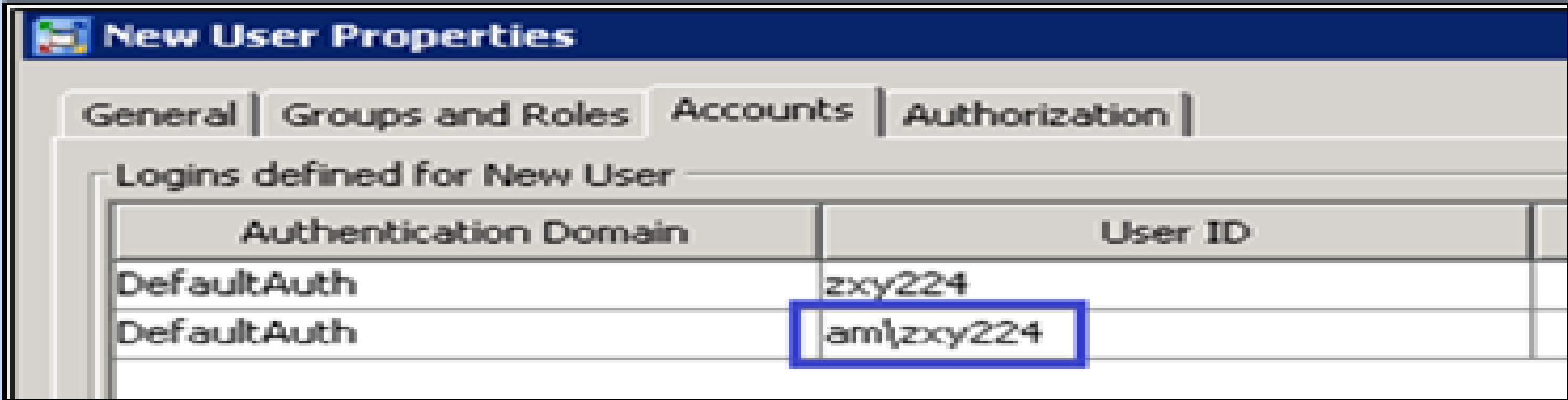


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## 8. Platform LSF - MULTIPLE DOMAIN USER AUTHORIZATION

Description	Issue	Solution
<ul style="list-style-type: none"><li>In SAS grid, LSF needs to be aware of user domain for which it allows to use SAS Grid.</li><li>This section explains how different domain-user can use SAS Grid platform.</li></ul>	<ul style="list-style-type: none"><li>This section explain how can we change or add new domain to allow users to access SAS-Grid.</li><li>This section explains how SAS Display Manager user can use SAS Grid, for which user's id with domain need to be added in SAS Management Console.</li></ul>	<ul style="list-style-type: none"><li>Variable, <b>LSF_USER_DOMAIN</b> is the key variable which controls the domain-user to use SAS Grid. This variable is defined in <b>lsf.conf</b> in conf directory under LSF deployment.<div><pre>[zxa9529@gridclient conf]\$ more lsf.conf   grep -i domain #RTM# LSF_USER_DOMAIN=TM:tm LSF_USER_DOMAIN=TM:tm:EU:eu [zxa9529@gridclient conf]\$</pre></div></li><li>Add user in SAS Management Console with DOMAIN:<div></div></li></ul>

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