

# Appendix: Additional Resources

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## Chapter 2

Concluding the SAS architecture chapter, the following is a list of supporting resources as noted in some of the sections discussed.

## Recommended Operating System Permissions for Windows and Unix/Linux

### WINDOWS

Resource:

<https://go.documentation.sas.com/?cdcId=bicdc&cdcVersion=9.4&docsetId=biig&docsetTarget=p0eqop8dtbe081n1x14tgs69a15z.htm&locale=en#n0e60dsgkw9hhcn1famibsekbu8b>

Recommended Operating System Protections for Windows Machines	
Directories	Users and Recommended Permissions
<b>SAS-configuration-directory</b>	SYSTEM and Administrators: Full Control All other users: List Folder Contents, Read
<b>SAS-configuration-directory\Lev1</b>	SYSTEM and Administrators: Full Control SAS Spawned Servers (sassrv): Windows Vista, Windows 7, and Windows Server 2008: Special Permissions to read and execute. Windows XP: Read and Execute All other users: List Folder Contents, Read
<b>SASMeta\MetaDataServer</b>	SYSTEM and Administrators: Full Control SAS Metadata Server: Service Login Account: Full Control Remove all other users and groups
<b>SASMeta\MetaDataServer\Backups</b> or other metadata server backup locations	SAS Deployment Backup and Recovery Tool User Account (aka backup user): Read
<b>Lev1\SASApp</b>	SYSTEM and Administrators: Full Control SAS Spawned Servers (sassrv): Windows Vista, Windows 7, and Windows Server 2008 only: Special Permissions to read and execute All other users: List Folder Contents, Read
<b>Lev1 subdirectories:</b> Documents, ReportBatch, SASMeta, Utilities, Web	SYSTEM and Administrators: Full Control All other users: List Folder Contents, Read
<b>Lev1 subdirectories:</b> ConnectSpawner, Logs, ObjectSpawner, SASApp\OLAPServer, ShareServer	SYSTEM and Administrators: Full Control  Remove all other users and groups

<b>SASApp subdirectories:</b> PooledWorkspaceServer StoredProcessServer	SYSTEM, Administrators: Full Control SAS Spawned Servers (sassrv): (Windows Vista, Windows 7, and Windows Server 2008 only): Read & Execute, List Folder Contents, and Read All other users: No access
<b>SASApp subdirectories:</b> PooledWorkspaceServer\Logs StoredProcessServer\Logs	SYSTEM, Administrators and SAS Spawned Servers (sassrv): Full Control
<b>SASApp subdirectories:</b> ConnectServer\Logs Data\wrsdist Data\wrstemp PooledWorkspaceServer\sasuser StoredProcessServer\sasuser WorkspaceServer\Logs	SYSTEM, Administrators, and SAS Spawned Servers (sassrv): Full Control
<b>Lev1</b> sasv9_meta.cfg file	SYSTEM and Administrators: Read and Write Remove all other users and groups

## UNIX

Default operating system protections that are automatically set for the configuration directories on UNIX and z/OS machines.

All of these directories are located in **SAS-configuration-directory/Lev1**.

Resource:

<https://go.documentation.sas.com/?cdcId=bicdc&cdcVersion=9.4&docsetId=biig&docsetTarget=p0eqop8dtbe081n1xl4tgs69a15z.htm&locale=en#p1aw225sa85f1ln1b93ai585ry7c>

Directories	Users and their Default Permissions
<b>SAS-configuration-directory</b> <b>SAS-configuration-directory/Lev1</b> <b>Lev1 subdirectories:</b> Documents, ReportBatch, SASApp, SASMeta, Utilities, Web	SAS Installer: Read, Write, and Execute  All other users: Read and Execute
<b>Lev1 subdirectories:</b> ConnectSpawner, Logs, ObjectSpawner, SASApp/OLAPServer, SASMeta/MetadataServer, ShareServer	SAS Installer: Read, Write, and Execute  All other users: No access
<b>SASApp subdirectories:</b> PooledWorkspaceServer StoredProcessServer	SAS Installer: Read, Write, and Execute  sas group: Read and Execute

<p><b>SASApp subdirectories:</b>  ConnectServer/Logs  Data/wrstdist  Data/wrstemp</p> <p>PooledWorkspaceServer/Logs  PooledWorkspaceServer/sasuser  StoredProcessServer/Logs  StoredProcessServer/sasuser  WorkspaceServer/Logs</p>	<p>SAS Installer: Read, Write, and Execute</p> <p>sas group: Read, Write, and Execute</p>
<p><b>Lev1:</b>  sasv9_meta.cfg file</p>	<p>SAS Installer: Read and Write</p> <p>All other users: no access</p>

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## Metadata Server Clustering

Here are some references you might find useful.

SAS 9.4 metadata cluster: what and why? Resource: <https://blogs.sas.com/content/sgf/2013/08/21/sas-9-4-metadata-cluster-what-and-why/>

Clustering the SAS Metadata Server, available at: <https://video.sas.com/detail/video/4403522585001/clustering-the-sas-metadata-server>

SAS 9.4 Metadata Clustering: How Quorum Works, available at: <https://video.sas.com/detail/video/4572848065001/sas-9.4-metadata-clustering:-how-quorum-works>

SAS 9.4 Metadata Clustering: Failover Situations available at: <https://video.sas.com/detail/video/4616389495001/sas-9.4-metadata-clustering:-failover-situations>

SAS 9.4 System Administration Guide - About Metadata Server Clustering available at: <https://go.documentation.sas.com/?docsetId=bisag&docsetTarget=p0yh730iuqhpp4n1ki3h7k6juu9h.htm&docsetVersion=9.4&locale=en>

Twelve Cluster Technologies Available in SAS® 9.4, available at: <https://support.sas.com/resources/papers/proceedings17/SAS0415-2017.pdf>

Best Practices for Deploying Your SAS® Applications in a High-Availability Cluster, available at: <http://support.sas.com/resources/papers/proceedings13/469-2013.pdf>

Best Practices for Implementing High Availability for SAS® 9.4, available at: [https://support.sas.com/rnd/scalability/grid/305\\_Doninger\\_FinalPaper.pdf](https://support.sas.com/rnd/scalability/grid/305_Doninger_FinalPaper.pdf)

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## Creating additional SAS 9 Instances

The SAS Migration Utility and the SAS Deployment Wizard enable you to create additional SAS 9.4 deployments. Such deployments have the exact same SAS content and the exact same configuration as the already existing SAS 9.4 deployment. Example when you might use this option:

- You want to set up a dev, test, prod environment
- You want to mirror your existing SAS environment to create a disaster recovery environment

- You get new hardware and have to move your SAS environment onto the new hardware

**Important:** When you use this option for any of the above described scenarios, please be aware that the new SAS 9 instances must have the exact same tiers and must be deployed across physical machines in the same fashion.

Further, any additional SAS environment you create must run on the same OS family. That means, you have to stay within the Windows family and the Unix family. Creating additional SAS environments with the migration utility across different platforms is not possible.

Note: The SAS Migration Utility is available only by request from [SAS Technical Support](#).

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## Chapter 3

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### Adding Users and Groups

#### Using SAS Management Console

<http://support.sas.com/documentation/cdl/en/mcsecug/69854/HTML/default/viewer.htm#n05epzfejyh3dn1xdw2lkaxwyrz.htm>

#### Programmatically

Bulk Load Macros - %mdu\* macros

<https://go.documentation.sas.com/?docsetId=bisecag&docsetTarget=n012hp5m00a1z2n1b598q4pknfih.htm&docsetVersion=9.4&locale=en>

SAS® 9.4 Language Interfaces to Metadata -> METADATA\_NEWOBJ Function

[https://go.documentation.sas.com/doc/en/pgmsascdc/9.4\\_3.5/lrmeta/p0ckrfx4pm9pj7n1x3x4e9ddx4cw.htm](https://go.documentation.sas.com/doc/en/pgmsascdc/9.4_3.5/lrmeta/p0ckrfx4pm9pj7n1x3x4e9ddx4cw.htm)

SAS® 9.4 Language Interfaces to Metadata -> METADATA\_SETASSN Function

<https://go.documentation.sas.com/?docsetId=lrmeta&docsetTarget=p1pt2ddn2xhmaen1p5whdq58ithh.htm&docsetVersion=9.4&locale=en>

Description of type "Group": SAS(R) 9.4 Metadata Model: Reference -> Group

<https://support.sas.com/documentation/cdl/en/omamodref/67417/HTML/default/viewer.htm#group.htm>

#### Importing Users and Groups

The bulk load macros are autocall macros and sample code that SAS provides to create your own programs that bulk load and manage user information, coordinating with AD, UNIX /etc/passwd files and other providers.

<https://go.documentation.sas.com/?cdcId=bicdc&cdcVersion=9.4&docsetId=bisecag&docsetTarget=n012hp5m00a1z2n1b598q4pknfih.htm&locale=en>. If you use the bulk load macros to import users from LDAP, you must use the macros for synchronizing as well whenever necessary.

Usage Note 40628: Automating the addition of users and groups to a SAS® Metadata Repository

<http://support.sas.com/kb/40/628.html>

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### Working with SAS Folders

<https://go.documentation.sas.com/?docsetId=bisag&docsetTarget=p0m58rt1se8r58n1dd6pujtbw13.htm&docsetVersion=9.4&locale=en>

Best Practices for Managing SAS Folders

<https://go.documentation.sas.com/?docsetId=bisag&docsetTarget=p0sc8uk5ttcvhzn1gfcjhkacwpcu.htm&docsetVersion=9.4&locale=en>

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## SAS Environment Manager

### Alerts

List of delivered alerts, available at:

[http://support.sas.com/rnd/emi/SASEnvMgr/EVSAF/All\\_Alert\\_Definitions.pdf](http://support.sas.com/rnd/emi/SASEnvMgr/EVSAF/All_Alert_Definitions.pdf)

Nice blog: SAS Environment Manager: Details on Alerting, available at:

<https://blogs.sas.com/content/sgf/2015/11/05/sas-environment-manager-details-on-alerting/>

Defining an Alert for SAS Work Directory, available at:

<http://support.sas.com/documentation/cdl/en/evug/69029/HTML/default/viewer.htm#p1u6rpfcxhmfxfvn1ay6n0ybxr9xu.htm>

Defining an Alert for a SAS Server Log File, available at:

<http://support.sas.com/documentation/cdl/en/evug/69029/HTML/default/viewer.htm#p1u6rpfcxhmfxfvn1ay6n0ybxr9xu.htm>

Defining an SNMP Alert Notification, available at:

<http://support.sas.com/documentation/cdl/en/evug/69029/HTML/default/viewer.htm#p1u6rpfcxhmfxfvn1ay6n0ybxr9xu.htm>

### Report Center

<http://support.sas.com/documentation/cdl/en/evug/69029/HTML/default/viewer.htm#n12v4rjg74mgrhn19m2gg64rerxq.htm>

Opening up the SAS Environment Manager Report Center, at:

<https://blogs.sas.com/content/sgf/2016/03/30/opening-up-the-sas-environment-manager-report-center/>

To create your own reports, see Auditing SAS server availability from 30,000 feet, at:

<https://blogs.sas.com/content/sgf/2016/10/06/auditing-sas-server-availability-from-30000-feet/>

and Adding Custom Reports to the Report Center

<http://support.sas.com/documentation/cdl/en/evug/69029/HTML/default/viewer.htm#p04sg86zvv5xyen1ohkrm3fv9maf.htm>

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## General Resources for SAS Environment Manager

To: log files for Troubleshooting, see Usage Note 61578: Enabling debug levels for the SAS® Environment Manager server log, at: <http://support.sas.com/kb/61/578.html>

For a complete overview and insight into SAS Environment Manager, check out SAS® Environment Manager 2.5: User's Guide, at:

[https://go.documentation.sas.com/?cdcId=evcdc&cdcVersion=2.5\\_M1&docsetId=evug&docsetTarget=titlepage.htm&locale=en](https://go.documentation.sas.com/?cdcId=evcdc&cdcVersion=2.5_M1&docsetId=evug&docsetTarget=titlepage.htm&locale=en)

Dashboard Tutorials. Part 1: Making the most out of your Dashboard: Dashboard Concepts at:

<https://video.sas.com/detail/video/4667015532001/making-the-most-out-of-your-dashboard:-using-the-sas-environment-manager---part-1---dashboard-concepts?autoStart=true&q=SAS%20Environment%20Manager>

Part 2: Making the most out of your Dashboard: Example Dashboard, at:

<https://video.sas.com/detail/video/4667016921001/making-the-most-out-of-your-dashboard:-using-the-sas-environment-manager---part-2---example-dashboard?autoStart=true&q=SAS%20Environment%20Manager>

Part 3: Making the most out of your Dashboard: Alert Portlets, at:

<https://video.sas.com/detail/video/4667016924001/making-the-most-out-of-your-dashboard:-using-the-sas-environment-manager---part-3---alert-portlets?autoStart=true&q=SAS%20Environment%20Manager>

SAS Environment Manager: Tracking Invalid Logon Notifications, at:  
<https://video.sas.com/detail/video/5094499197001/sas-environment-manager:-tracking-invalid-logon-notifications?autoStart=true&q=SAS%20Environment%20Manager>

Use SAS Environment Manager to Get SAS License Expiration Notice at:  
<https://video.sas.com/detail/video/5028127350001/use-sas-environment-manager-to-get-sas-license-expiration-notice?autoStart=true&q=SAS%20Environment%20Manager>

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## SAS Deployment Manager

Update Passwords

<https://go.documentation.sas.com/doc/en/bicdc/9.4/bisecag/p13mipjyz9eh9bn14mqjtjgrd2lia.htm#n06djkwzzqca m2n0z6o3eblq0i09>

Rebuild the SAS Web Applications

<https://go.documentation.sas.com/?docsetId=bimtag&docsetTarget=p0plwle8uj04upn1vrsbstiwkzmz.htm&docsetVersion=9.4&locale=en#p12md63aqqqxy7n11j17rzwpsa2h>

Redeploying SAS Web Applications:

<https://go.documentation.sas.com/?docsetId=bimtag&docsetTarget=n02nbqc1n26j7gn1lgpbgss3ev8p.htm&docsetVersion=9.4&locale=en>

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## Removing Configuration

To be on the safe side, please check with SAS Technical Support before removing any configurations and, most importantly, run a backup before any changes are made. Please take a close look at Chapter 7 in this book, which is all about backing up and restoring in SAS.

Please read the documentation carefully before unconfiguring anything, especially Identify dependent Products at:

<https://go.documentation.sas.com/?cdcId=bicdc&cdcVersion=9.4&docsetId=biig&docsetTarget=n09026intelpatform00install.htm&locale=en#n09030intelplatform00install> And Removing a SAS Configuration, at:  
<https://go.documentation.sas.com/?cdcId=bicdc&cdcVersion=9.4&docsetId=biig&docsetTarget=n09026intelpatform00install.htm&locale=en>

## Setinit Information

<https://go.documentation.sas.com/?docsetId=bisag&docsetTarget=n0k9xtqxtq1oubn1bd9k1iwh9ukx.htm&docsetVersion=9.4&locale=en>

## Changing Machine Names

To learn about the different steps, check out:

The Machine Name Has Changed in a Single-Machine Deployment, at:

<https://go.documentation.sas.com/?docsetId=bisag&docsetTarget=n19bv01p02akhn1croxbxo3m4bx.htm&docsetVersion=9.4&locale=en#p1rvvbeiwq5ca5n1sn4v8n0icyr9>

A Single-Machine Deployment Has Been Cloned to Another Machine at

<https://go.documentation.sas.com/?docsetId=bisag&docsetTarget=n19bv01p02akhn1croxbxo3m4bx.htm&docsetVersion=9.4&locale=en#p0eubp2pptcmo8n1lk1bzdgom5el>

A Multiple-Machine Deployment Has Been Cloned to a New Set of Machines

<https://go.documentation.sas.com/?docsetId=bisag&docsetTarget=n19bv01p02akhn1croxbxo3m4bx.htm&docsetVersion=9.4&locale=en#n086p5zniz46m7n1ujkpgsk3zwak>

The Metadata Server Has Been Cloned to a New Machine at:

<https://go.documentation.sas.com/?docsetId=bisag&docsetTarget=n19bv01p02akhn1croxbxo3m4bx.htm&docsetVersion=9.4&locale=en#p1uq244zzrotfln12a964ws1dwux>

Name of a SAS Application Server Host Machine Has Changed at:

<https://go.documentation.sas.com/?docsetId=bisag&docsetTarget=n19bv01p02akhn1croxbxo3m4bx.htm&docsetVersion=9.4&locale=en#n0n4ej819c0fy5n13j4rr36u86nq>

Network Domain has changed

<https://go.documentation.sas.com/?docsetId=bisag&docsetTarget=n19bv01p02akhn1croxbxo3m4bx.htm&docsetVersion=9.4&locale=en#n1svzhou0drmznn130w0sj8uyk97>

## Hot Fixes

You can find great information about the Hot Fix FAQ at

<https://support.sas.com/en/technical-support/maintenance/hot-fixes/hot-fix-faq.html>

You can download Hot Fixes from the support website at:

<http://ftp.sas.com/techsup/download/hotfix/hotfix.html>

## Change Passphrase

For Supported algorithms to encrypt data storage content, see Encryption for Data at Rest at:

<https://go.documentation.sas.com/?docsetId=bisecag&docsetTarget=p00bmiufcj33d2n1286druo49pnu.htm&docsetVersion=9.4&locale=en>

For supported algorithms by content and network traffic, see Encryption for Data in Motion at:

<https://go.documentation.sas.com/?docsetId=bisecag&docsetTarget=n18y8dk8uv3k68n19o46db1tk9hl.htm&docsetVersion=9.4&locale=en>

## Locale Setup Manager

Multilingual Computing with SAS® 9.4 at:

[http://support.sas.com/resources/papers/Multilingual\\_Computing\\_with\\_SAS\\_94.pdf](http://support.sas.com/resources/papers/Multilingual_Computing_with_SAS_94.pdf)

Usage Note 51586: How to change the default SAS® session encoding to UTF-8 at:

<http://support.sas.com/kb/51/586.html>

Overview of Locale Concepts for NLS at:

<https://go.documentation.sas.com/?docsetId=nlsref&docsetTarget=p0b7o0cr0lbtidin11ssvbbpsmv6k.htm&docsetVersion=9.4&locale=en>



National Language Support in SAS at:

<https://go.documentation.sas.com/?docsetId=nlhref&docsetTarget=p0wqfkbuw8h0qan1hzcv8rs3f63.htm&docsetVersion=9.4&locale=en>

## Uninstall Software

For that reason, should you ever need to uninstall software, please be sure to become familiar with:

Uninstalling SAS Interactively at:

<https://go.documentation.sas.com/?docsetId=biig&docsetTarget=n10005intelplatform00install.htm&docsetVersion=9.4&locale=en#n10007intelplatform00install>

Uninstalling SAS Non-Interactively at:

<https://go.documentation.sas.com/?docsetId=biig&docsetTarget=n10005intelplatform00install.htm&docsetVersion=9.4&locale=en#n10008intelplatform00install>

Using the SAS Content Server Administration Console at:

<https://go.documentation.sas.com/?docsetId=bimtag&docsetTarget=p02sxa8j5yn6j0n1ug8tbvxe9kt3.htm&docsetVersion=9.4&locale=en>

Troubleshooting web applications at:

<http://support.sas.com/documentation/cdl/en/appsrvtuning/69859/HTML/default/viewer.htm#n0vkt7fexusebun1ojgdjytve82d.htm>

Troubleshooting SAS Content Server at:

<http://support.sas.com/resources/papers/sas-9-4-content-server-troubleshooter.pdf>

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## Chapter 4

SAS Roles

<https://go.documentation.sas.com/?docsetId=bisecag&docsetTarget=n0ebv8vttay59vn11b5ar2i8ewyg.htm&docsetVersion=9.4&locale=en>

User Roles in SAS 9.4

<https://go.documentation.sas.com/?docsetId=bisag&docsetTarget=p0bn84jnrfd73n1ny9n03k5uevg.htm&docsetVersion=9.4&locale=en#p1tp56mwnd2n09n1u05qyneszeji>

Registering Custom Tasks as Capabilities in SAS Enterprise Guide

<https://go.documentation.sas.com/?docsetId=bidaag&docsetTarget=p06cu4sub60trkn19oxirp0j8lyn.htm&docsetVersion=9.4&locale=en>

About User Roles for System Administration

<https://go.documentation.sas.com/?docsetId=bisag&docsetTarget=p0bn84jnrfd73n1ny9n03k5uevg.htm&docsetVersion=9.4&locale=en#p1tp56mwnd2n09n1u05qyneszeji>

Product -related groups, check out Desktop Clients Administration at:

<https://go.documentation.sas.com/?docsetId=bidaag&docsetTarget=n191jhg4tbdyymn19jzcyohz9w6s.htm&docsetVersion=9.4&locale=en>

For web client roles, see SAS Web Applications Administration at

<https://go.documentation.sas.com/?docId=bicdc&cdcVersion=9.4&docsetId=biwaag&docsetTarget=titlepage.htm&locale=en>.

User Import Macros

<https://go.documentation.sas.com/doc/en/bicdc/9.4/bisecag/p02wesbzrochnbn1na7fqdy2gdvo.htm>

Introduction to Authentication Mechanisms

<https://go.documentation.sas.com/?cdcId=bicdc&cdcVersion=9.4&docsetId=bisecag&docsetTarget=n171zb6r0gzzqgtn1fguw15jlz4sw.htm&locale=en>

Internal User IDs

<https://go.documentation.sas.com/?docsetId=biig&docsetTarget=n02002intelplatform00install.htm&docsetVersion=9.4&locale=en#n02004intelplatform00install>

Overview of Initial Users, Groups and Roles, at:

<https://go.documentation.sas.com/?docsetId=bisag&docsetTarget=p0bn84jnfrdc73n1ny9n03k5uevg.htm&docsetVersion=9.4&locale=en>

User Administration Tasks

<https://go.documentation.sas.com/?cdcId=bicdc&cdcVersion=9.4&docsetId=mcsecug&docsetTarget=n1f7xz9ptgwpdkn1s6050d4eadvd.htm&locale=en>

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## Chapter 5

To learn about the data sources SAS can access, take a look at:

<https://go.documentation.sas.com/?cdcId=bicdc&cdcVersion=9.4&docsetId=bidsag&docsetTarget=p0i782osdgo43tn1ehq1t7xgtw1i.htm&locale=en>

Details on SAS Folders are available here:

<https://go.documentation.sas.com/?cdcId=bicdc&cdcVersion=9.4&docsetId=bisag&docsetTarget=n0rw08757br2bzn1j6uzmsygzwwu.htm&locale=en>

To create additional SAS application servers, look at Overview of Adding an Additional SAS Application Server for details:

<https://go.documentation.sas.com/?docsetId=biasag&docsetTarget=n10001intelplatform00srvradm.htm&docsetVersion=9.4&locale=en#n10002intelplatform00srvradm>

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### Documentation for metadata libraries

A quick guide to connecting to Oracle from SAS, at: <https://communities.sas.com/t5/SAS-Communities-Library/A-quick-guide-to-connecting-to-Oracle-from-SAS/tac-p/518051#M3362>

Managing Libraries with SAS Enterprise Guide Explorer, at:

<https://go.documentation.sas.com/?docsetId=bidaag&docsetTarget=n14hxpvmrifi3n1wi1imvu9n5h8.htm&docsetVersion=9.4&locale=en>

You can find guidance and information about pre-assignment here: Pre-assign SAS libraries? If so, which method? Resource: <https://blogs.sas.com/content/sgf/2013/05/15/pre-assign-sas-libraries-if-so-which-method/>

Understanding Pre-Assigned Libraries, at:

<https://go.documentation.sas.com/?docsetId=bidsag&docsetTarget=p1ac6c9mrz0gn2n1spvpkf55ttyk.htm&docsetVersion=9.4&locale=en>

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### Metadata Bound Libraries

Testing Direct Access to SAS Metadata Bound Libraries and Tables, at:

<https://platformadmin.com/blogs/paul/2012/12/testing-direct-access-sas-metadata-bound-libraries-and-tables/>

A Programming Approach to Implementing SAS® Metadata-Bound and Using Metadata-Bound Libraries to Authorize Access to SAS® Data, at: <https://www.sas.com/content/dam/SAS/support/en/sas-global-forum-proceedings/2018/2181-2018.pdf>

Official SAS documentation: Overview of Metadata-Bound Libraries, at:

<http://support.sas.com/documentation/cdl/en/seclibag/66930/HTML/default/viewer.htm#n1eocpvh5x71ufn1hqvvdja13ia3.htm>

Implementation, at:

<http://support.sas.com/documentation/cdl/en/seclibag/66930/HTML/default/viewer.htm#p1t76vny0n5g4an1tdf7dh0br0ca.htm>

Troubleshooting, at:

<http://support.sas.com/documentation/cdl/en/seclibag/66930/HTML/default/viewer.htm#n0410126axc7hln1txppbeaqthl3.htm>

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## Chapter 6

Introduction to the Encryption Model, at:

<https://go.documentation.sas.com/doc/en/bicdc/9.4/bisecag/p01f1rmg9qf0o3n1nayx5ffwyd2t.htm>

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### Authentication

How to Facilitate Authentication:

<https://go.documentation.sas.com/?docsetId=bisecag&docsetTarget=p0jg4z3f7mmu7on1alezgx454jil.htm&docsetVersion=9.4&locale=en>

Authentication Model:

<https://go.documentation.sas.com/?docsetId=bisecag&docsetTarget=p0sajzx39gs312n18ud96czemphr.htm&docsetVersion=9.4&locale=en>

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### User and Group Management

Chapter 4 in this Admin Book

Also: Introduction to User Administration, at:

<https://go.documentation.sas.com/?cdcId=bicdc&cdcVersion=9.4&docsetId=mcsecug&docsetTarget=aboutum.htm&locale=en>

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### Specialized permissions in SAS

Described in the SAS Security Guide: Specialized Permissions in SAS.

<https://go.documentation.sas.com/?cdcId=bicdc&cdcVersion=9.4&docsetId=bisecag&docsetTarget=p1b2lkyw1gefxcn14v68kok29w1b.htm&locale=en#n110hgo5artjgcn13dkfs520jo0u>

I would recommend you will take a peek at it simply to understand and to see whether these are permissions that would apply to you.

---

### Permissions, Objects and Inheritance

Which SAS9 Permission Wins?, at: <https://communities.sas.com/t5/SAS-Communities-Library/Which-SAS9-Permission-Wins/ta-p/411454>

For permission conflict situation: <https://communities.sas.com/t5/General-SAS-Programming/Metadata-permissions-conflict/m-p/195482>

SAS Security Administration Guide – Identity Hierarchy, at:

<https://go.documentation.sas.com/?cdcId=bicdc&cdcVersion=9.4&docsetId=bisecag&docsetTarget=p1s27nop9ri85qn1w6f5z31j78fh.htm&locale=en>

Authorization Decisions, at:

<https://go.documentation.sas.com/?cdcId=bicdc&cdcVersion=9.4&docsetId=bisecag&docsetTarget=p0gtni3mrspnd9n1is3377rq8w0y.htm&locale=en>

Object Inheritance, at:

<https://go.documentation.sas.com/?docsetId=bisecag&docsetTarget=p0eqebtrv1qhzhn1qje3kytr5kcr.htm&docsetVersion=9.4&locale=en>

Permission Origins, at:

<https://go.documentation.sas.com/?docsetId=bisecag&docsetTarget=p13af9f45o2t3hn1oe41x9rdcooa.htm&docsetVersion=9.4&locale=en>

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## Authorization Batch tools

Check out: About the Batch Tools for Metadata Authorization at:

<https://go.documentation.sas.com/?docsetId=bisecag&docsetTarget=n09eorx5a5283xn11w12pncp0m0s.htm&docsetVersion=9.4&locale=en>

Another tool that you could use to list relationships is provided with 9.4 and is called Batch Relationship Reporting Tools. The tool's purpose is it to find data relationship. However, you could use this tool to see how folders, tables, libraries are related to each other.

Check out Relationships are easy! – for SAS objects, at:

<https://blogs.sas.com/content/sgf/2015/03/04/relationships-are-easy-for-sas-objects/>

What to do if you locked yourself out of SAS Management Console or don't remember the password; or you inherit an environment, and no one told you the admin password? There is help! Check out Unlock an Internal Account at:

<https://go.documentation.sas.com/?cdcId=bicdc&cdcVersion=9.4&docsetId=bisecag&docsetTarget=p135ufuc50p223n1ve02cy1a69u3.htm&locale=en>

Getting Started with Designing and Implementing a SAS® 9.4 Metadata and File System Security Design, at:

<http://support.sas.com/resources/papers/proceedings17/SAS0709-2017.pdf>

This Ask the Expert webinar requires a SAS Profile. If you do not have one yet, it is easy to create:

<https://www.sas.com/profile/ui/#/create?returnURL=https:%2F%2Fsupport.sas.com%2Fen%2Fsupport-home.html>

SAS® 9.4 Intelligence Platform: Security Administration Guide, at:

<https://go.documentation.sas.com/doc/en/bicdc/9.4/bisecag/titlepage.htm>

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## Chapter 7

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### Best Practices and further Resources

About Backups and Restore

<https://go.documentation.sas.com/?docsetId=bisag&docsetTarget=p11n59n3frgizfn1656a8jnkf1j1.htm&docsetVersion=9.4&locale=en>

Best Practices for Backing Up Your SAS Content

<https://go.documentation.sas.com/?docsetId=bisag&docsetTarget=n1n8fnuni6kbjgn1805ilb6xn9vf.htm&docsetVersion=9.4&locale=en>

Best Practices for Restoring Your SAS Content

<https://go.documentation.sas.com/?cdcId=bicdc&cdcVersion=9.4&docsetId=bisag&docsetTarget=n0wcfgj5nuz68jn1a0mi5jibi89c.htm&locale=en>

Admin Notebook: Making the case for selectively backing up metadata

<https://blogs.sas.com/content/sgf/2018/02/28/admin-notebook-making-case-selectively-backing-metadata/>

Backup and Recovery when Upgrading

[https://go.documentation.sas.com/?cdcId=pgmsascdc&cdcVersion=9.4\\_3.3&docsetId=whatsdiff&docsetTarget=n00m2cydvt0eyin1brgz44clzse0.htm&locale=en](https://go.documentation.sas.com/?cdcId=pgmsascdc&cdcVersion=9.4_3.3&docsetId=whatsdiff&docsetTarget=n00m2cydvt0eyin1brgz44clzse0.htm&locale=en)

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### Backup

If you would like to change the backup schedule, see [Modifying Backup Schedule](#) at:

<https://go.documentation.sas.com/?docsetId=bisag&docsetTarget=p0zvk8iitgb98kn16sk4d0b8pkpv.htm&docsetVersion=9.4&locale=en#n0dtcvt5j5xhiun1e8if2ezd0b6a>

If you decide to modify the default backup directory, please keep the following in mind (excerpted from “Follow these Guidelines”, available at:

<https://go.documentation.sas.com/?docsetId=bisag&docsetTarget=p0zvk8iitgb98kn16sk4d0b8pkpv.htm&docsetVersion=9.4&locale=en>):

Recommended Operating System Protections for Windows Machines at:

<https://go.documentation.sas.com/?docsetId=biig&docsetTarget=p0eqop8dtbe081n1xl4tgs69a15z.htm&docsetVersion=9.4&locale=en#n0e60dsgkw9hhcn1famibsekbu8b>

Default Operating System Protections for UNIX at:

<https://go.documentation.sas.com/?docsetId=biig&docsetTarget=p0eqop8dtbe081n1xl4tgs69a15z.htm&docsetVersion=9.4&locale=en#plaw225sa85f1ln1b93ai585ry7c>

Recovering the SAS Metadata Server:

<https://go.documentation.sas.com/?docsetId=bisag&docsetTarget=p0i62ly9w7d2eln1vu3j3tbyujxi.htm&docsetVersion=9.4&locale=en>

Troubleshooting Metadata Server Recovery Jobs

<https://go.documentation.sas.com/?docsetId=bisag&docsetTarget=p0i62ly9w7d2eln1vu3j3byujxi.htm&docsetVersion=9.4&locale=en#n1calb2s45rsnkn1o6uig9yrcgel>

PROC METAOPERATE: Pausing and resuming the server

<https://go.documentation.sas.com/?docsetId=bisag&docsetTarget=n1n8fnuni6kbjgn1805ilb6xn9vf.htm&docsetVersion=9.4&locale=en#n02aw6ul2p5ilfn1w7ln3qetze0u>

For more Backup and Recovery Commands, check out:

<https://go.documentation.sas.com/?docsetId=bisag&docsetVersion=9.4&docsetTarget=p131nfed85vx6jn1dai1ofsw6mk1.htm&locale=en>

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## Promotion (Export and Import Wizards)

Take a look at “Using the Export Wizard to Back Up your SAS Environment”, available at:

<https://go.documentation.sas.com/?docsetId=bisag&docsetTarget=p1naabsaagihlzn17oown33w3hno.htm&docsetVersion=9.4&locale=en>

For general information about the Promotion tools, see Introduction to the Promotion Tools, available at:

<https://go.documentation.sas.com/?docsetId=bisag&docsetTarget=p04l8c3fo8tpyhn103dps7pxvru2.htm&docsetVersion=9.4&locale=en>

About the Batch Export and Import Tools, at:

<https://go.documentation.sas.com/?docsetId=bisag&docsetTarget=p16u72wwciy3y0nlwq3iarcqr116.htm&docsetVersion=9.4&locale=en>

Restoring Metadata Associations

<https://go.documentation.sas.com/?docsetId=bisag&docsetTarget=n12yx7dt662tpln1c1ymxiajfw8.htm&docsetVersion=9.4&locale=en#n0szxtzj56dr49n1dacix8mk4ywc>

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## SAS Deployment Backup and Recovery Tool (DBRT)

For further information about customization, see Using Backups and Restoring Customizations in the SAS documentation, go to

[https://go.documentation.sas.com/doc/en/pgmsascdc/9.4\\_3.5/whatsdiff/n16p8i84u516w2n1rgyxfj9wy516.htm](https://go.documentation.sas.com/doc/en/pgmsascdc/9.4_3.5/whatsdiff/n16p8i84u516w2n1rgyxfj9wy516.htm)

Specifying a Central Vault Location in a Homogeneous Operating System Environment, at:

<https://go.documentation.sas.com/?docsetId=bisag&docsetTarget=p0vgmymia8h4qmn1oguxfe6oq7au.htm&docsetVersion=9.4&locale=en#p1nw3fxyb6xv8kn153zml7u7fe47>

Specifying a Central Vault Location in a Heterogeneous Operating System Environment, at:

<https://go.documentation.sas.com/?docsetId=bisag&docsetTarget=p0vgmymia8h4qmn1oguxfe6oq7au.htm&docsetVersion=9.4&locale=en#n0g8c2p2lsmu3fn1b0md5vq546j4>

Deployment Backup Command Reference sas-display-backup

<https://go.documentation.sas.com/?docsetId=bisag&docsetTarget=n0khpct4rb0syn191i08w765cw1.htm&docsetVersion=9.4&locale=en>

Creating custom directories

<https://go.documentation.sas.com/?docsetId=bisag&docsetTarget=n0khpct4rb0syn191i08w765cw1.htm&docsetVersion=9.4&locale=en#p1ilc2s1s8h8xnn0zlik8z35ujin.>

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## Free Training Resources

Free e-learning:

SAS Platform Administration: Getting Started, at:

<https://support.sas.com/edu/schedules.html?id=9340&ctry=US>

Articles:

Top 10 Resources Every SAS® Administrator Should Know About, at:

<http://support.sas.com/resources/papers/proceedings14/SAS106-2014.pdf>

Super Food for the SAS Administration Brain, Part IV: Self-Study, at: <https://www.linkedin.com/pulse/super-food-sas-administration-brain-iv-self-study-anja-fischer/>

Videos

Top 10 Platform Administration Tasks, at: <https://video.sas.com/detail/video/5281008981001/top-10-platform-administration-tasks?autoStart=true&q=Administration>

Advanced SAS Administration, at: <https://video.sas.com/detail/video/4232011724001/advanced-sas-administration?autoStart=true&q=Advanced%20SAS%20Administration>

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## Education Training Classes

If you are entirely new to SAS and to SAS administration without previous knowledge, SAS Platform Administration: Getting Started – is great for diving into the world of SAS administration. It's a great starting point as it covers an introduction to a SAS environment, to SAS metadata, you will learn about the SAS clients, such as SAS Enterprise Guide, to give you one example, and more. For details, take a look at:

<https://support.sas.com/edu/schedules.html?id=9340&ctry=US>

Further admin training courses:

SAS Platform Administration: Fast Track, at: <https://support.sas.com/edu/schedules.html?ctry=us&crs=SPAFT>

The *SAS Platform Administration: Fast Track* This is a pretty extensive class because it covers a lot of ground in a short period of time. It is great for personas people who are new to SAS and SAS administration.

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## Chapter 8

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### SAS Servers

Troubleshooting the SAS Server Tier, at:

<https://go.documentation.sas.com/?docsetId=biig&docsetTarget=n08003intelplatform00install.htm&docsetVersion=9.4&locale=en>

SAS Note: Utility that manages multi-tiered SAS® services for Unix/Linux deployments, at:

<http://support.sas.com/kb/58/231.html>

An Oasis of Serenity in a Sea of Chaos: Automating the Management of Your UNIX/Linux Multi-tiered SAS® Services, at: <http://support.sas.com/resources/papers/proceedings17/SAS0339-2017.pdf>

Using the sas.servers Script on UNIX, at:

<https://go.documentation.sas.com/?docsetId=bisag&docsetTarget=n1fxn02xr08732n1p0kph4z4145t.htm&docsetVersion=9.4&locale=en>

Running Servers as Windows Services, at:

<https://go.documentation.sas.com/?docsetId=bisag&docsetTarget=n11hox4i2tgybvn1omal5elwlv5k.htm&docsetVersion=9.4&locale=en>

About Checking the Status of Servers, at:

<https://go.documentation.sas.com/?cdcId=bicdc&cdcVersion=9.4&docsetId=bisag&docsetTarget=n1r6hplsw8v6tin18jky6ceyy1d.htm&locale=en>

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## Task: Restart Java Web Application Servers in the mid-tier periodically.

Additional resources:

Restarting web Application Servers, at:

<http://go.documentation.sas.com/?cdcId=bicdc&cdcVersion=9.4&docsetId=bimtag&docsetTarget=n0kn00ddbhus6zn18h6t4b7vn7ed.htm&locale=en>

SAS Environment Manager is a great tool to keep an eye on the memory heap for your middle tier, at

<http://support.sas.com/documentation/cdl/en/appsrvtuning/69859/HTML/default/viewer.htm#p1kwvsi8oujet5n1ng794y1turj5.htm>

SAS® 9.4 web applications: Tuning for Performance and Scalability at

<http://support.sas.com/documentation/cdl/en/appsrvtuning/69859/HTML/default/viewer.htm#n1ov80pk0vgicvn1ufz72qxanf4q.htm>

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## Task: Check for long-running SAS sessions

PROC IOMOPERATE. Check out Using PROC IOMOPERATE to list and stop your SAS sessions at:

<https://blogs.sas.com/content/sasdummy/2016/02/15/using-proc-iomoperate/>

A custom task to list and stop your SAS sessions, at: <https://blogs.sas.com/content/sasdummy/2016/02/20/proc-iomoperate-custom-task/>

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## Task: Become familiar with SAS client administration

**Important:** For your users to log on to any SAS client, they need a profile. This profile is used for authentication. For all needed details, see Administering Connection Profiles for Desktop Applications at:

<https://go.documentation.sas.com/?cdcId=bicdc&cdcVersion=9.4&docsetId=bidaag&docsetTarget=n02nj8d394nrxn14x9p3eksf6wu.htm&locale=en>

For some of the SAS clients, SAS automatically creates roles during the SAS installation. Become familiar with the roles. Consider: if the default roles are exactly what is needed for your environment, or, if you want to add or remove capabilities for user groups.

**Note:** Please do not change a default role's capabilities. If you want to have capabilities assigned that are not available in a role yet, create custom roles as described here:

<https://go.documentation.sas.com/?cdcId=bicdc&cdcVersion=9.4&docsetId=mcsecug&docsetTarget=p1cjojd8xg629ln1mtjcg6h13rkk.htm&locale=en>

**Important:** A role's capabilities have nothing to do with permissions. A capability decides – for example – whether a user can see certain menu items. If you do not want the admin user Beate to see the User Manager plug-in in SAS Management Console, you can hide this functionality using a role's capabilities. Permissions decide who can do what: Users Gwenny and Carlie are allowed to access certain libraries and



certain tables in SAS Enterprise Guide, but they might not have the capability to open files from a local computer.

And further:

Administering File Locations, at:

<https://go.documentation.sas.com/?cdcId=bicdc&cdcVersion=9.4&docsetId=bidaag&docsetTarget=n1cpksm22xny9sn1rnuqvt9z5439.htm&locale=en>

About Desktop Clients Administration Scroll down to see a list of all desktop clients and its administration tasks, at:

<https://go.documentation.sas.com/?cdcId=bicdc&cdcVersion=9.4&docsetId=bidaag&docsetTarget=p09mluxgzkuy2dn1rzvkprezwim9.htm&locale=en>

The following article is helpful as it covers SASWORK, which is important for your users' daily work. Monitor your SASWORK directory from SAS Environment Manager.

<https://blogs.sas.com/content/sgf/2015/08/19/monitor-your-saswork-directory-from-sas-environment-manager/>

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## Task: Logging and Troubleshooting

See the following information for the log file locations in your SAS environment:

Default Location for SAS Logs, at:

<https://go.documentation.sas.com/?cdcId=bicdc&cdcVersion=9.4&docsetId=bisag&docsetTarget=p1ausbmrryuyyn1xnxb6jmdfarz.htm&locale=en>

Usage Note 55426: Locating the log files for the SAS® 9.4 middle tier, at:

<http://support.sas.com/kb/55/426.html>

Ways to monitor server activity, see About Server Monitoring, at:

<https://go.documentation.sas.com/?cdcId=bicdc&cdcVersion=9.4&docsetId=bisag&docsetTarget=n1h2z3u6myoejhn1jnepczsjgerk.htm&locale=en>

To understand the SAS logging facility and to learn how to increase the logging levels, which comes in handy for troubleshooting, take a look at About Server Logging, at:

<https://go.documentation.sas.com/?cdcId=bicdc&cdcVersion=9.4&docsetId=bisag&docsetTarget=n1162ioc4910wvnl1n0bdoid5809i.htm&locale=en>

Modifying Your Server Logging Configurations, at:

<https://go.documentation.sas.com/?cdcId=bicdc&cdcVersion=9.4&docsetId=bisag&docsetTarget=p02ybm1lgy skc6nl1jmk88w7se9o8.htm&locale=en>

Enable More Detailed Logging for Server Troubleshooting, at:

<https://go.documentation.sas.com/?cdcId=bicdc&cdcVersion=9.4&docsetId=bisag&docsetTarget=p0hchigzq8wvtrn1tnllswe7jmqb.htm&locale=en>

Often, SAS administrators need to know who did what. The following blog article provides some good input: <https://blogs.sas.com/content/sgf/2015/09/30/part-1-auditing-data-access-who-did-what-and-when/>

To collect SAS server logs and configuration files automatically, check out the *LogConfigSweeper* tool in SAS Blog: Sweep up my SAS logs at <https://communities.sas.com/t5/SAS-Communities-Library/Sweep-up-my-SAS-logs/ta-p/257385>) and the following SAS Note: <http://support.sas.com/kb/54/813.html>

SAS Usage Note: Using the LogConfigSweeper tool for automated log and configuration data collection for SAS Servers: Troubleshooting SAS Servers, at:

<https://go.documentation.sas.com/?docsetId=biig&docsetTarget=n08003intelplatform00install.htm&docsetVersion=9.4&locale=en>

Troubleshooting system performance problems: Performance monitoring and troubleshooting, at: <http://support.sas.com/kb/53/877.html>

Frequently Asked Questions Regarding Storage Configurations, at: <http://support.sas.com/resources/papers/proceedings15/SAS1500-2015.pdf>

Yes, these are a lot of resources, but you will find that some of them can be used as “look-up-resources” for situation where you – to name one example – need to know where a certain log file is located. You do not have to have all log file locations of your SAS environment stored away in your head. The important thing is that you know where to get that information! In the list of resources above you will also find a nice blog and other helpful information.

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## Task: Cleaning up log file locations

Great information around deleting log files:

SAS administrators tip: Automatically deleting old SAS logs <https://blogs.sas.com/content/sgf/2018/07/17/delete-sas-logs-admin/>

SAS Admin Community: SAS Logs Purge Job/Script <https://communities.sas.com/t5/Administration-and-Deployment/SAS-Logs-Purge-Job-Script/td-p/433278>

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## Task: Monitoring

Please take a look at the following table for reference: Using SAS Environment Manager to Monitor SAS Servers, at:

<https://go.documentation.sas.com/?docsetId=bisag&docsetTarget=n028cvr46rmbmsn169v7qiav3tdl.htm&docsetVersion=9.4&locale=en>

Information about general SAS server monitoring using SAS Environment Manager, SAS Management Console or third-party tools, take a look at About SAS Server Monitoring, at:

<https://go.documentation.sas.com/?docsetId=bisag&docsetTarget=n1h2z3u6myoejhn1jnepczsjgerk.htm&docsetVersion=9.4&locale=en> .

Also see: Monitoring the Activity of SAS Servers, at:

<https://go.documentation.sas.com/?cdcId=bicdc&cdcVersion=9.4&docsetId=bisag&docsetTarget=p0xhobaca1tgxcn1f8bbz87lra5v.htm&locale=en>

## SAS Environment Health

The SAS documentation provides good information about monitoring, such as:

Monitoring Resources:

<https://go.documentation.sas.com/?cdcId=bicdc&cdcVersion=9.4&docsetId=evug&docsetTarget=p0c8oj2kww2pnbn1r3q3d1o8rzc.htm&locale=en>

Service Architecture Alert Definitions,

at: <https://go.documentation.sas.com/?cdcId=bicdc&cdcVersion=9.4&docsetId=evug&docsetTarget=n0urxjgvbkxyo5n1dyp1onad56nq.htm&locale=en>

Auditing SAS server availability from 30,000 feet, at: <https://blogs.sas.com/content/sgf/2016/10/06/auditing-sas-server-availability-from-30000-feet/>

Auditing using the SAS Environment Manager Report Center– tips and tricks, at:

<https://blogs.sas.com/content/sgf/2016/06/13/auditing-using-the-sas-environment-manager-report-center-tips-and-tricks/>

Monitor your SASWORK directory from SAS Environment Manager, at:

<https://blogs.sas.com/content/sgf/2015/08/19/monitor-your-saswork-directory-from-sas-environment-manager/>

SAS Environment Manager: compatible groups save time, at: <https://blogs.sas.com/content/sgf/2015/02/18/sas-environment-manager-compatible-groups-save-time/>

Ensuring that Your SAS® Infrastructure Is Able to Meet Your SAS Users' Demands, at: <http://support.sas.com/resources/papers/proceedings16/SAS6207-2016.pdf> This paper provides you with some great pointers as to what measures are important to monitor.

Locating Modified Content, at: <https://blogs.sas.com/content/sgf/2016/08/10/locating-modified-content/>

For more information about SAS Environment Manager, see Chapter 3 in this book, SAS Administration Tools.

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## Task: Update your SAS license

Take a look at the SAS 9.4 Software License Renewal Instructions:

[http://support.sas.com/documentation/installcenter/en/ikwinplannedri/66607/PDF/default/setinit\\_planned.pdf](http://support.sas.com/documentation/installcenter/en/ikwinplannedri/66607/PDF/default/setinit_planned.pdf)

SAS 9.4 Software License Renewal Instructions for all the glory details.

Further helpful information: Admin Tip - How to check a SAS Setinit/License in Metadata?

<https://communities.sas.com/t5/Administration-and-Deployment/Admin-Tip-How-to-check-a-SAS-Setinit-License-in-Metadata/m-p/497202#M14367>

Two steps to update your SAS License and check if it is updated:

<https://blogs.sas.com/content/sgf/2016/08/02/two-steps-to-update-your-sas-license-and-check-if-it-is-updated/>

Scripting SAS 9.4 License Updates (quietly): <https://communities.sas.com/t5/SAS-Communities-Library/Scripting-SAS-9-4-License-Updates-quietly/ta-p/394895>

Lastly, I would like to recommend the discussion “SAS License Renewal “on the SAS Admin Community at: , at: <https://communities.sas.com/t5/Administration-and-Deployment/SAS-License-Renewal/m-p/528258#M15467>

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## SAS Administration and Deployment Community

[https://communities.sas.com/t5/Administration-and-Deployment/bd-p/sas\\_admin](https://communities.sas.com/t5/Administration-and-Deployment/bd-p/sas_admin)

Administration and Deployment, at: [https://communities.sas.com/t5/Administration-and-Deployment/bd-p/sas\\_admin](https://communities.sas.com/t5/Administration-and-Deployment/bd-p/sas_admin)

SAS Hot Fix Announcements, at: <https://communities.sas.com/t5/SAS-Hot-Fix-Announcements/bg-p/hf>

SAS Product Release Announcements, at: <https://communities.sas.com/t5/SAS-Product-Release/bg-p/tsrelease>

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## SAS Blogs and Newsletters

SAS Learning Subscription, at: [https://www.sas.com/en\\_us/training/offerings/learning-subscription.html](https://www.sas.com/en_us/training/offerings/learning-subscription.html)

SAS Technical Support, at: <https://support.sas.com/en/technical-support.lang.html>

Newsletters, at: [https://www.sas.com/it\\_it/news/e-newsletters.html#tech-report](https://www.sas.com/it_it/news/e-newsletters.html#tech-report)