

# Personal experiences of implementing and using SAS 9

Phil Mason, Wood Street Consultants, England

## ABSTRACT

SAS 9 is great and very powerful - truly an enterprise product. You can still use it in a rather "small" way though, much like you would SAS 8, however you really get value when you use some of the Business Intelligence parts of SAS 9. This paper describes my personal experiences of installing and using SAS 9 over the last 2.5 years.

## INTRODUCTION

I was lucky to get an early release of SAS 9 before it was generally available. This was to help me in writing a revised edition of my book "In the Know: SAS Tips & techniques from around the globe". I was also lucky to get a contract as a SAS Consultant for the Office of National Statistics in the UK. My primary role was to examine the new features of SAS 9 to determine which of them could be of use for ONS. This gave me a unique opportunity to experiment with a wide range of new features and products within SAS 9. I also had to install and configure the early releases. My experiences of this, along with some SAS 9 work I have done for other clients, forms the basis of this paper. These are all my opinions and in no way represent the views of any of my clients. This paper will talk about SAS 9 from a windows-centric perspective.

## DIFFERENCES BETWEEN 8.2

### INSTALLATION

If you haven't used SAS 9 then you will be interested in how it differs from the previous version, SAS 8.2. In short, there may or may not be many differences to you depending on what parts of SAS 9 you adopt.

- 8.2 was feeding in a lot of CDs

To install SAS 8.2 you basically had to sit there after running the setup program and feed in anywhere between 5 and 15 CDs, depending on which products you were using. Once this was done, there were a few products which needed a little further configuration, but basically loading the software was all that was required.

- 9.1 is like 8.2 plus configuring software

To install SAS 9.1 you still have to feed in a lot of CDs, but there is quite a lot of configuration that needs to be done after that as well. That is, if you are using any of the Business Intelligence products then there will certainly be a lot of configuration. If you are merely using some basic products, Foundation SAS, Graph, ODS, etc. then you may be able to get away with simply feeding in CDs as you did in 8.2.

If you do need to do configuration then this can take a varying amount of time – the shortest configuration that can be done is probably about 20 minutes, but the longest could take hours or even days (to get it right). Remember, this is my experience. And also remember, things are improving with every release.

### EXTRA PRODUCTS

SAS 9 has a range of new products available with it. If you simply renew your license and don't buy any of the new products then you will be missing out on a huge amount of useful new functionality. Particularly the Business Intelligence products really must be examined. SAS is now an Enterprise solution and can solve many of your organizations problems – so take a look and see what new products may help you.

### USING SAS 9 LIKE IT WAS 8.2

It is still possible to use SAS 9 in the same way you used 8.2. You can use all the same functionality without using any of the new functionality. This has always been the way with SAS, which is why its always a good idea to upgrade. Its also a good reason to not be scared off upgrading. Even if you want to use the more complex Business Intelligence products, you can upgrade to SAS 9 and start using the 8.2 functionality immediately, whilst later on configuring and using the BI functionality.

## INSTALLING SAS 9

This can be the hardest part of getting SAS 9 going. If you are using the BI parts of SAS 9 then the configuration is quite complex.

### EARLY VERSIONS OF SAS 9

Always make sure you install the latest release that you can get. I have found that the installation process improves with every release. Back when the initial versions of SAS 9 came out there was a great long list of configuration tasks that had to be completed manually. This list was not even complete, since some tasks such as defining required user ids was not on the list at all. So even if you followed the directions precisely you would still need to make some deductions to determine what else had to be done to make the whole process work. I once watched a SAS UK consultant attempt to install SAS 9 on a server by following

his list of directions. It failed and he tried to fix it for several hours without success. It turned out that the list of directions was incomplete.

## LOADING THE SOFTWARE

This is the easy part – sort of. In our current collection of CDs for SAS 9 we have 46 separate CDs. If you are going to install SAS on more than 2 PCs then it will probably be worth your while copying the CDs onto a network accessible drive so that you can install from there. That's what I did and it saves a lot of time in the long run.

If you want to install specific products then you can put in various CDs, find the appropriate setup program and run it.

## HIGH LEVEL OVERVIEW OF THE STEPS

The following list of configuration steps was generated as part of the installation process. The steps generated are determined by the products that I have chosen to install. These steps are part of a file called instructions.html – on my system I used all the defaults and the file was located in C:\SAS\9.1\instructions.html. To use this file you simply can click on the links for each of the steps, which takes you down to the instructions for that step. Some of the steps have a link to a .bat file which will carry out the tasks in the step for you. Other steps are simply directions that must be followed.<sup>1</sup>

1. Start your Metadata Server
2. Start the SAS Management Console
3. Define your Metadata Repository
4. Define your Metadata Users
5. Define your Web Users
6. Defining Default Authorizations
7. Define your SAS Application Server
8. Define your Stored Process Server
9. Define your OLAP Server
10. Define your Object Spawner
11. Define your SAS/CONNECT Server
12. Define your SAS/CONNECT Spawner
13. Define your SAS/SHARE Server
14. Define your HTTP Server
15. Define the SAS Foundation Services to the metadata
16. Load SAS Stored Process samples
17. Load Web Infrastructure Kit "primer" metadata
18. Start your Object Spawner
19. Start your OLAP Server
20. Start your SAS/CONNECT Spawner
21. Start your SAS/SHARE Server
22. Start your SAS Services Application
23. Deploying your Web Applications
24. Start your Tomcat Server
25. Using your Applications
26. Getting More Information

### EXAMPLE - STEP 1


#### Start your Metadata Server

The Metadata Server must be started before continuing with these steps. The SAS Configuration Wizard will attempt to start the Metadata Server for you. Based on your system settings, this automatic startup may not be successful.

The Configuration Wizard created a shortcut in your Start menu at: Programs -> SAS -> 9.1 -> **Start SAS Metadata Server**.

### EXAMPLE – STEP 19

#### Define your OLAP Server

 You can run this step automatically by selecting this link:

<C:\SAS\9.1\Lev1\Utilities\MetadataDeployment\bin\loadOLAPServer.bat> Once the step completes successfully, [proceed to the next step](#).

Select the top level of the SAS Application Server, **SASMain**, you created above.

1. Using the right mouse button, select **Add Application Server Component...**
2. Select **OLAP Server**

---

<sup>1</sup> This list is generated by the SAS system – not me!

3. Select Basic configuration
4. Authentication Domain: **DefaultAuth**
5. Host Name: **work**
6. Port: **5451**
7. Review settings and select Finish.

Edit the path for temporary working files

1. Select "+" to expand the Server Manager node. Fully expand all three levels of **SASMain**.
2. Highlight the lowest level, **SASMain - OLAP Server**. Using the right mouse button, select **Properties**.
3. On the Options tab, select the **Advanced Options** button.
4. Select the **Performance** tab.
5. In the "Path for temporary working files" field, enter: **.\OLAPServer\work** (NOTE: The "." is required when entering the path into SAS Management Console.)
6. Select OK to save changes.

## CONFIGURE SOFTWARE MANUALLY

If any steps that have an automatic method of running fail to work then you can still carry out the step by following the instructions in the step.

## LATEST VERSION - SAS 9.1.3 SERVICE PACK 4

Service packs are like mini-releases. They not only contain bug fixes, but often contain a lot of new functionality. They are certainly worth installing as quickly as you can. At the time of writing Service Pack 4 is the latest available for SAS.

## PLAN FILES

A plan file can be used to drive the SAS install process. The plan file specifies what must be installed. A plan file is created by a utility which works out what products are required given selections made. This is because there are various dependencies within the software, so depending on what products you choose you may require other products to be installed to support them. There are some general purpose plan files provided with SAS 9, and you can use one of these if they seem to meet your needs. You can also contact SAS support staff to provide you with a plan file for the software products that you wish to install. They are happy to do this and it is probably the safest thing to do if you want to make absolutely sure things work first time.

I would love to see a plan creation tool made available to us SAS administrators. Then we could generate plans depending on what kind of install we wanted to do. Some sites define different types of user and then have different numbers of products licensed for those groups. For example you may have:

- Classic SAS user – who has all products available including interactive SAS like in SAS 8.2.
- Web user – who can use web based Business Intelligence products such as Web Report Studio, Web OLAP Viewer and SAS Portal.
- Business SAS user – who has Enterprise Guide and/or Office Add-in

You should have a separate plan file for each of these types of user.

## THIRD PARTY PRODUCTS NEEDED

The main thing to watch out for when installing the various third party products required is to ensure you get the right version. There are many versions of the java runtime library (for instance) but there will be only one that has been tested for SAS 9.1.3 Service Pack 4. These will usually be provided on the CDs, but you can go look at

[support.sas.com/documentation/configuration/thirdpartysupport/](http://support.sas.com/documentation/configuration/thirdpartysupport/) to get a list of the right versions to use for the version of SAS you are installing. If you are using BI products then you are likely to need to install the following types of product, along with some examples of specific product names.

- Java Runtime Environment (JRE)
  - For client applications
  - For SAS Foundation
- Java Development Kit (JDK)
  - Windows, UNIX, AIX, z/OS, etc.
- Web Browser
- Web Application Server (a.k.a. Servlet Container)
  - Apache Tomcat (this is free!)
  - BEA Weblogic
  - IBM Websphere
- Web Server
  - Apache Web Server (free!)
- WebDAV Server

- Xythos Web File Server
- Apache HTTP Server (free!)

## SOME INSTALLATION TIPS & TRAPS

A few things that come to mind are:

1. Get a plan file made by SAS Institute for each kind of install you want to do.
2. Follow the instructions in instructions.html carefully.
3. If you're installing Tomcat, make sure you install it without spaces in the directory path – e.g. C:\tomcat4.1
4. Some logs are produced as you go through the installation steps, such as:
  - a. Metadata Deployment logs - C:\SAS\9.1\Lev1\Utilities\MetadataDeployment\logs
  - b. Web Infrastructure Kit Configuration log - C:\SAS\9.1\configure\_web.log
5. Once you have completed the installation then if things are not working as you expect you can look for one of the many log files to get more information about what is happening or failing. For instance in my default installation I can look at these logs:
  - a. Metadata Server log - C:\SAS\9.1\Lev1\SASMain\MetadataServer\logs
  - b. Object Spawner log - C:\SAS\9.1\Lev1\SASMain\ObjectSpawner\logs
  - c. OLAP Server log - C:\SAS\9.1\Lev1\SASMain\OLAPServer\logs
  - d. Share Server log - C:\SAS\9.1\Lev1\SASMain\ShareServer\logs
  - e. Stored Process Server log - C:\SAS\9.1\Lev1\SASMain\StoredProcessServer\logs
  - f. Workspace Server log - C:\SAS\9.1\Lev1\SASMain\WorkspaceServer\logs
  - g. Portal log - C:\SAS\9.1\Lev1\web\Deployments\Portal\logs
  - h. Remote Services log - C:\SAS\9.1\Lev1\web\Deployments\RemoteServices\logs
  - i. Web Report Studio log - C:\SAS\9.1\Lev1\web\Deployments\WebReportStudio\logs
  - j. C:\Tomcat4.1\logs
  - k. C:\Program Files\Apache Group\Apache2\logs

## PLANNING ARCHITECTURE

### WHY BOTHER?

You can just pick a bunch of products and install them, and you may want to do that at first when you get SAS 9 so you can play around with it and try things out. However it is a big complex system and you will get most value from it if you think about what you are trying to achieve and plan your architecture before you install it.

One thing that is potentially complex with SAS 9 is that there are a number of servers that can be installed and they can all be on the same machine, or each one on a different machine. You need to think about where you put the servers.

For some kinds of servers you can define one or more physical servers pointing to one or more logical servers. This provides a great deal of functionality and needs some thinking about.

### THINK ABOUT THE FOLLOWING

1. Put SAS servers on the right machine for the job. For instance, is your OLAP/Server located on a machine where it can have fast access to the data it is mostly going to use?
2. Decide how many stored process servers you want. You can define a number of physical stored process servers within one logical stored process server. Each of these can be on the same or different machines.
3. Decide how many logical stored process servers you want. You can define a number of logical stored process servers, each pointing to physical servers. You can have different logical servers for different kinds of users or business areas, etc.
4. You can define many things in the metadata which can then be used throughout SAS 9. Some things must be defined, others are optional. Defining them in the metadata has many advantages, primarily in making centralized information available to those using SAS 9. Here are a few things you can define:
  - a. SAS libraries or librefs pointing to anything that SAS is able to access, such as EXCEL, Oracle, and so on.
  - b. Users and the things they can access.
  - c. Stored processes without the need for Enterprise Guide.

### WHAT CHOICES NEED MAKING?

SAS 9 sometimes provides a range of tools that allow the same job to be done. It is then a matter of picking the best tool for the job in your particular organization.

- Security handling? There are several ways of handling this that SAS supports, such as LDAP and Microsoft Directory services.
- Web & servlet container? Do you have a corporate tool. SAS supports about 85% of the tools used in the market. Particularly well supported are the Apache tools, which are very good and free to use.
- webDAV on web server? webDAV is a way of reading and writing to files on a web server, and is typically used to

store reports on the server which can be accessed without re-running the report.

- Methods to invoke stored processes? Will you run your stored processes from Microsoft EXCEL, a web browser, Enterprise Guide or a Java program? These are just some of the choices and you may want to use some or all of the methods available.
- Web Services? You can now create SAS Web Services, so do you want to?
- What will your programmers use to write SAS code? You may use “classic SAS” or may go for “Enterprise Guide”.
- What level are your users? Do they need something simple like SAS Information Delivery Portal? Or something more powerful like Web Report Studio? Or something even more powerful and flexible like Enterprise Guide?
- Who will administer SAS 9? Will one or many be able to use Management Console and change metadata settings?

## USING SAS 9

There are many new Business Intelligence products in SAS 9, which make up a lot of the interesting and useful new content. They are outlined in the next section, but it’s beyond the scope of this paper to go into them.

There are some other new products that I haven’t mentioned here, which are quite specialized in their use. So check the “What’s New” documentation to read about them. e.g. SAS Data Surveyor for Oracle.

Most products in SAS have been significantly improved and changed, so check the “What’s New” for each product.

## STORED PROCESSES

In talking about SAS 9 I must mention stored processes. They are quite similar to macros, in that they are programs which can be passed parameters and run. The power of a stored process is that it has these features:

- can be run from various products such as Web Report Studio, Enterprise Guide, a web browser, SAS Information Delivery Portal
- has metadata which defines things such as:
  - groups or users able to run it
  - system that code will run on
  - location of SAS code
  - parameters and their defaults
  - kind of output produced, such as streaming output or a package
- can be created using management console and a text editor
- can also be created using tools such as Enterprise Guide, which generates the code and metadata for you

If you still don’t really understand why these are great, then go and research stored processes some more, or email me for a demo. They will change the way that you and others use SAS.

## ADMINISTRATION

SAS 9 is complex, if you use tools requiring the metadata. Depending on what tools you use and how much you go into it, you may find it is very complex to administer. One of my clients has devoted a team of 3 people to administering SAS 9, and they do this pretty much full time. SAS 8.2 had one person responsible for installs, and once the install was done then there was nothing else to do until the next setinit came along. SAS 9 has so many servers running and so much metadata in use, that it can require a lot of maintenance and administration to get the best value from it.

## BUSINESS INTELLIGENCE PRODUCTS

The following outlines the major Business Intelligence products in SAS 9, along with a brief description of what they do.

### BI SERVER

An encompassing term that usually refers to all the following products.

### SAS ADD-IN FOR MICROSOFT OFFICE

Software allowing you to access SAS, use coding wizards, run stored processes and more from within Microsoft Word, Power Point or EXCEL.

### SAS DATA INTEGRATION STUDIO (A.K.A. ETL STUDIO)

Visual design tool to do ETL (Extract, Transform & Load data).

### SAS ENTERPRISE GUIDE

Allows creation of programs and stored processes within the SAS 9 architecture and metadata – complete with wizard based coding and scheduling facilities. This is an alternative tool for SAS coding.

### SAS INFORMATION DELIVERY PORTAL

A web based portal to SAS which is integrated with metadata to allow running of stored processes, accessing reports and much more.

### SAS INFORMATION MAP STUDIO

Visual design tool to create information maps which combine data to provide information tables. Required for Web Report Studio.

#### **MANAGEMENT CONSOLE**

Application to manage metadata within the SAS 9 system for all the BI products. This is at the core of SAS 9.

#### **SAS OLAP SERVER**

Allows development and deployment of scalable OLAP applications.

#### **OLAP CUBE STUDIO**

Visual design tool to create OLAP applications using OLAP/Server.

#### **WEB REPORT STUDIO**

Web based visual design tool to define, access & run reports.

### **CONCLUSIONS**

#### **MOST GENERALLY USEFUL NEW PRODUCTS**

Make sure you try these out. I'm sure your local SAS salesperson would be happy to arrange a trial for you. If you're not using these I think you should have a good reason.

- Web Infrastructure Kit
- Management Console
- Enterprise Guide
- Office Add-in
- Web Report Studio

#### **OTHER VERY USEFUL PRODUCTS, DEPENDING ON YOUR NEEDS**

The following products are also incredibly useful if you have a need for the functionality they provide. I guess you could say that about a lot of things but in my opinion there are some parts of SAS that I just wouldn't recommend (ask me about it). But these products are best-of-breed, if you need what they offer.

- OLAP/Server & OLAP Cube Studio
- Data Integration Studio
- SAS Information Delivery Portal
- Enterprise Miner

#### **SUGGESTIONS TO MAXIMIZE BENEFITS**

Throughout the paper I have suggested ensuring that you understand some key terms and technologies. SAS 9 has a lot of new stuff. It may not all be for you, but if you don't get up to speed on what is there then you are likely to be missing out and doing a lot more work than you need to.

As an example, here is a before and after of how one person used SAS 9.

##### **Before**

Each week he ran weekly reports, and checked them over. Report requests came in and were produced and results emailed to requesters in the appropriate format. Often a series of report requests would be handled since the requester wasn't quite sure what they were looking for and refined their requests along the way.

##### **After**

ETL studio was used to define the loading of data into a data warehouse, and then loads were run automatically. Regular reports were defined in Enterprise Guide and scheduled to run. OLAP cubes were built which enabled users to explore and analyze data themselves. Report requests were written in Enterprise Guide as stored processes which were then used as required from Microsoft Word, EXCEL and PowerPoint to bring the results to the tool of choice.

### **ACKNOWLEDGMENTS**

Thanks to the Office of National Statistics where I have been able to work as a SAS 9 Architect for the last few years.

### **CONTACT INFORMATION**

Your comments and questions are valued and encouraged. Contact the author at:

Phil Mason  
Wood Street Consultants Ltd.  
16 Wood Street  
Wallingford, Oxfordshire, OX10 0AY, ENGLAND  
E-mail: [phil@woodstreet.org.uk](mailto:phil@woodstreet.org.uk)  
Web: [www.woodstreet.org.uk](http://www.woodstreet.org.uk)

SAS and all other SAS Institute Inc. product or service names are registered trademarks or trademarks of SAS Institute Inc. in the USA and other countries. ® indicates USA registration.

Other brand and product names are trademarks of their respective companies.