

Paper 471-2013

## Creating metadata environment from existing one for testing purpose

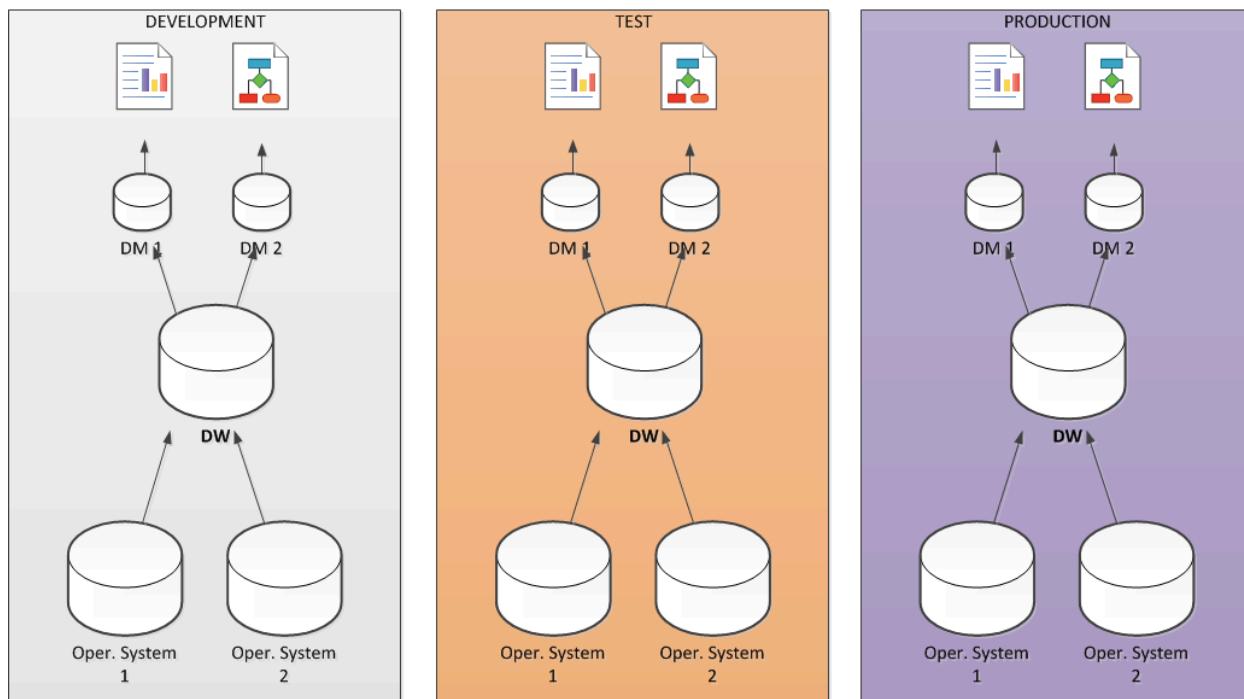
Jouni Javanainen, Lead Technical Architect, Aureolis Oy

### ABSTRACT

Most organizations have a need for development, test and production environments, either in the same physical platform or on separate platforms. Separate environments may not use the same ports of communication. It is possible to define specific communication ports by using migration packages from existing metadata to avoid disturbing the other environments. In addition to this only a few extra finishing steps are required, such as defining paths of directories or libraries. It is important that this type of environment can be created through a formal process quickly, reliably and efficiently. This paper covers how easily identical environments can be created for development and testing purposes utilizing existing SAS® tools.

### INTRODUCTION

It is a minimum requirement to have at least one composite development-testing environment against every production environment. It is also desirable to have development and testing environments separate from one another (Figure 1).



**Figure 1. Separated Development, Testing and Production Environments**

However, it is not always that simple. For instance you might need a second development environment because the operational system is under development. Developing operational system itself has nothing to do with Business Intelligence, but you might have to test that your reporting system is running without errors with this operational system. Organization might have also some long term projects running and you once again need a new development environment for this purpose.

Metadata Level environment is the key to your challenges. You must have a process to duplicate metadata environment systematically to secure that you can continue to develop parallel development lines. For instance, you need development lines for developing production, developing changes in the operational system and developing a

project. Figure 2 displays a picture of three separate development environments running on the same server. This can be done by isolating the environments using different metadata levels.

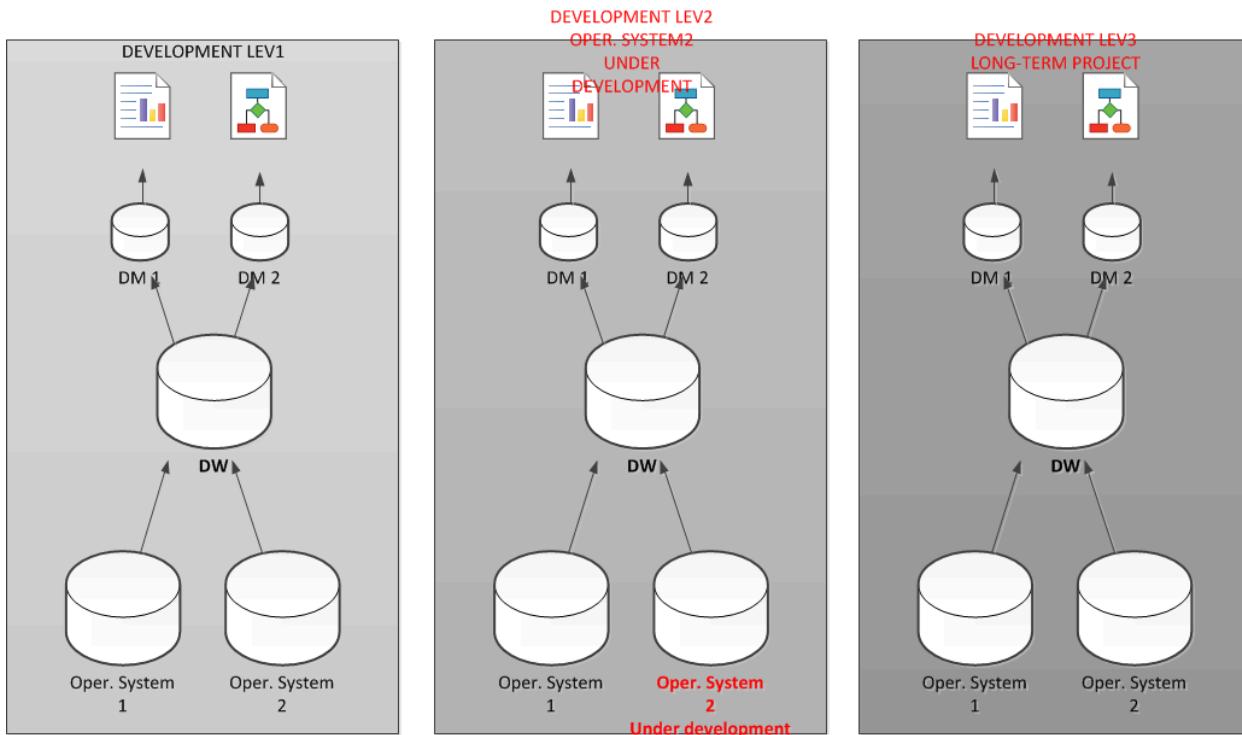


Figure 2. Three development environments on the same server

## METADATA ENVIRONMENT

### METADATA IN GENERAL

Metadata environment can be called a “Level environment” or simply “Lev”. It means that you can have several logical environments, for instance for testing purposes. One SAS metadata environment consists of SAS® Metadata Server, Object Spawner, SAS® Work Space Servers, SAS® Stored Process Servers, J2EE Server, etc.

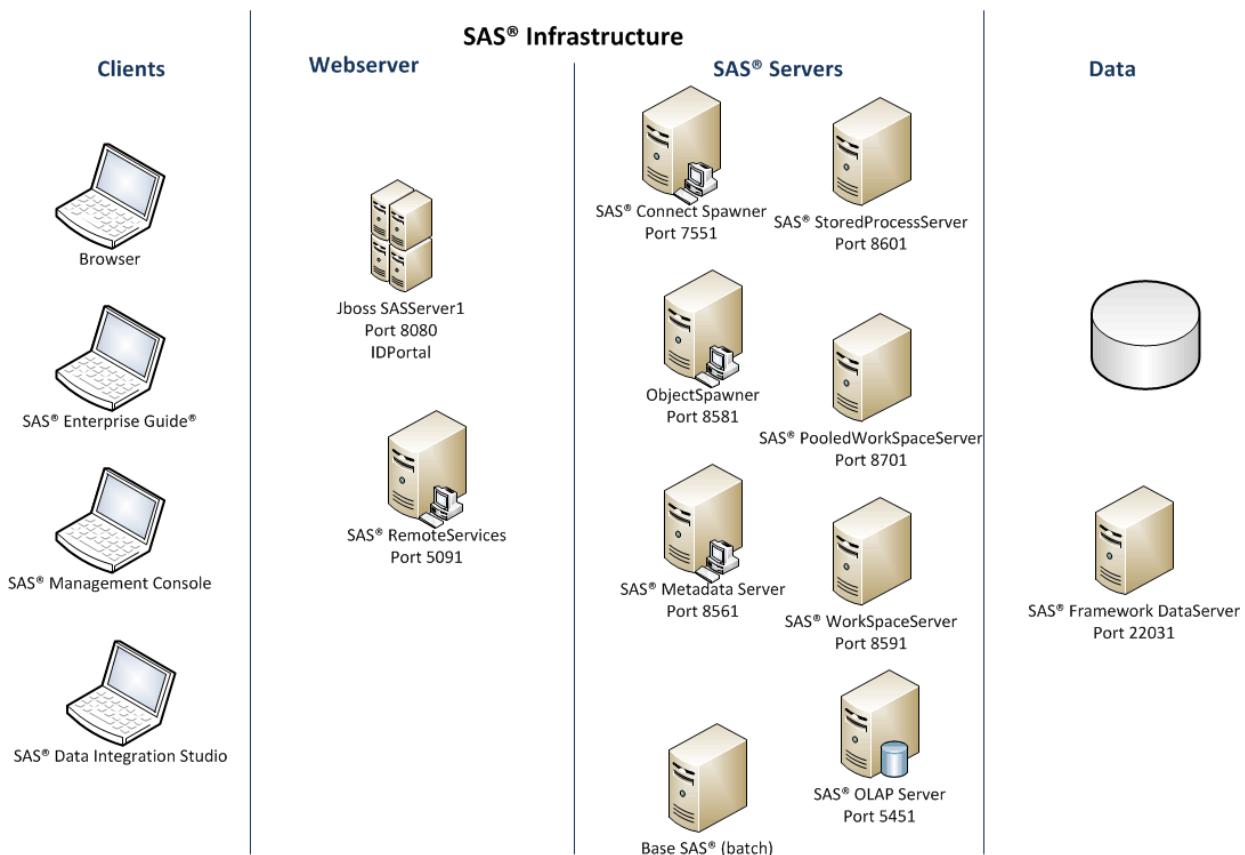
Each of the Lev-environments is independent because each service is running using a dedicated port number.

Normal SAS Lev-environment, usually production environment or developing environment for production, is called Lev1. Next environments can be named Lev2, Lev3, etc.

SAS has a good set of tools to build and maintain these kinds of environments. In theory, using the same methodology you can build environments Lev2 – Lev9 but in practice you must take some other things into account such as port conflicts and server performance limits.

### ARCHITECTURE

Figure 3 is a typical SAS metadata infrastructure of level 1. Notice that all ports in level 1 end with 1, except JBoss which has standard port 8080.



**Figure 3. Typical infrastructure of SAS metadata environment (Level 1)**

Figure 4 describes environment on level 3. Notice that nothing but port numbers have been changed. Now they end with 3. JBoss is an exception because it runs on port 8380.

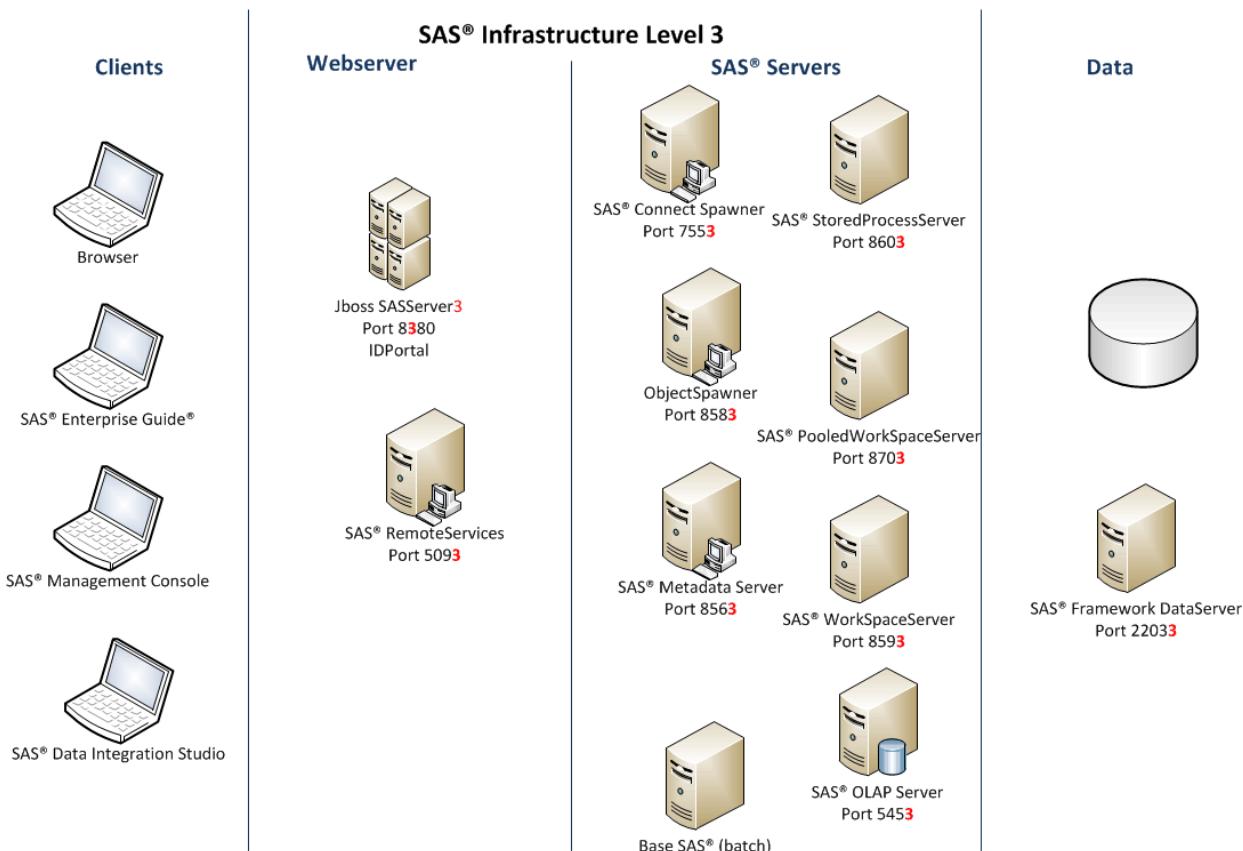


Figure 4. Typical infrastructure of SAS metadata environment (Level 3)

## PORNUMBERS OF SAS SERVICES

Each port of SAS services on Level 1 ends with digit 1. For instance the port of the metadata server on Level 1 is 8561 and the port of the connect spawner is 7551.

Similarly, all ports of SAS services on Level 2 end with digit 2. For instance the port of the metadata server on Level 2 is 8562 and the port of the connect spawner is 7552.

Etc.

## POTS OF J2EE WEB SERVER

SAS supports JBoss, WebLogic and WebSphere as a J2EE WebServer. They all use different port numbers and actually each web server instance uses several port numbers at the same time.

You can control which set of ports will serve each Lev-environment.

For instance, JBoss uses normally port number 8080. You can set port\_offset-option, for example to the value of 300, which increases all the port numbers with 300 (normal port will be 8380) for Level 3.

## CREATING A NEW LEVEL OF METADATA

### MAIN STEPS FOR CREATING A NEW LEVEL OF SAS METADATA ENVIRONMENT

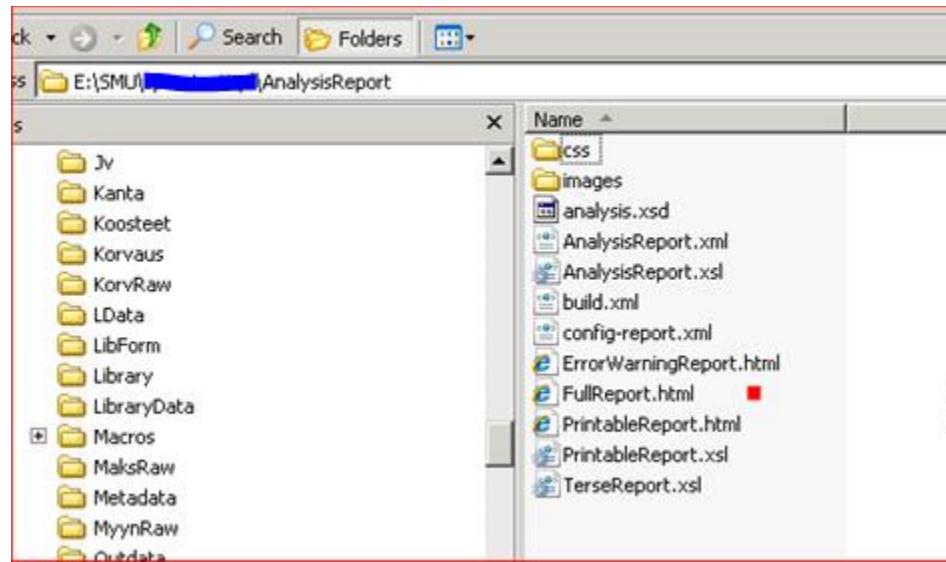
1. Create SAS Migration Utility package (SMU) from existing metadata environment, for example from Lev1
2. Configure new metadata environment, for example Level 3, from SMU
3. Post-configure metadata you just created

These steps are described in the following sections.

## SMU

First you need to create SAS Migration Utility package (SMU) using your existing metadata. Edit properties template for your needs and create a new command file to make it easier to run the SMU package in your environment. You can find the properties template and exe file in your SAS Software Depot under the directory \utilities\smu93.

Always remember to read Analysis reports after you have run SMU-package. Display 1 illustrates that reports are found under the directory AnalysisReport of your package.



Display 1. Analysis reports of SMU-package are stored inside a package.

The same SMU-package can be used as a source to several metadata environments as is shown in Figure 5.

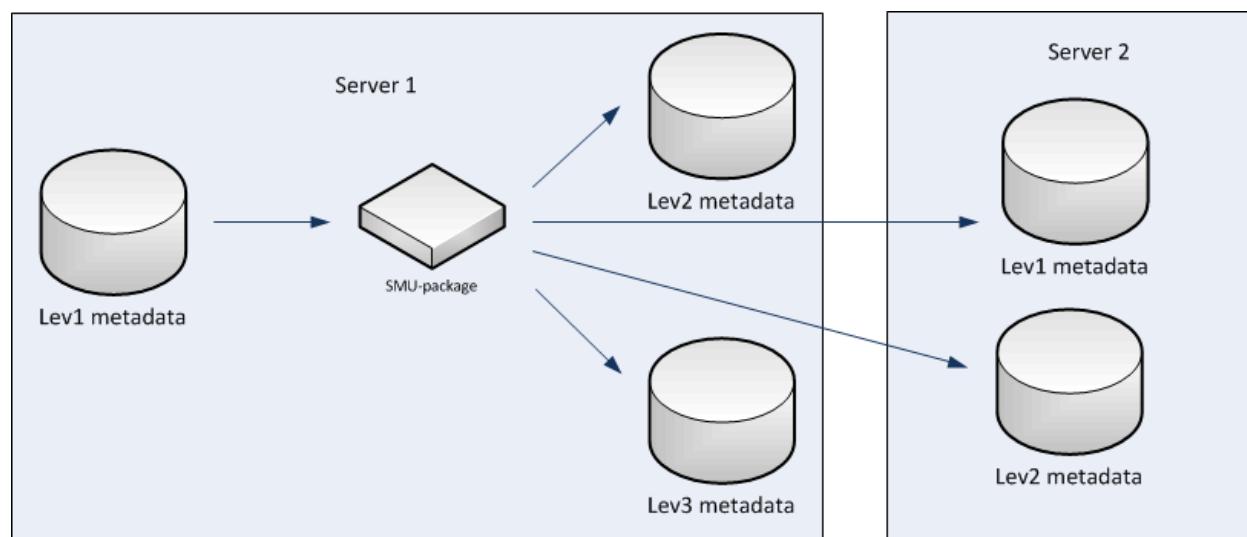
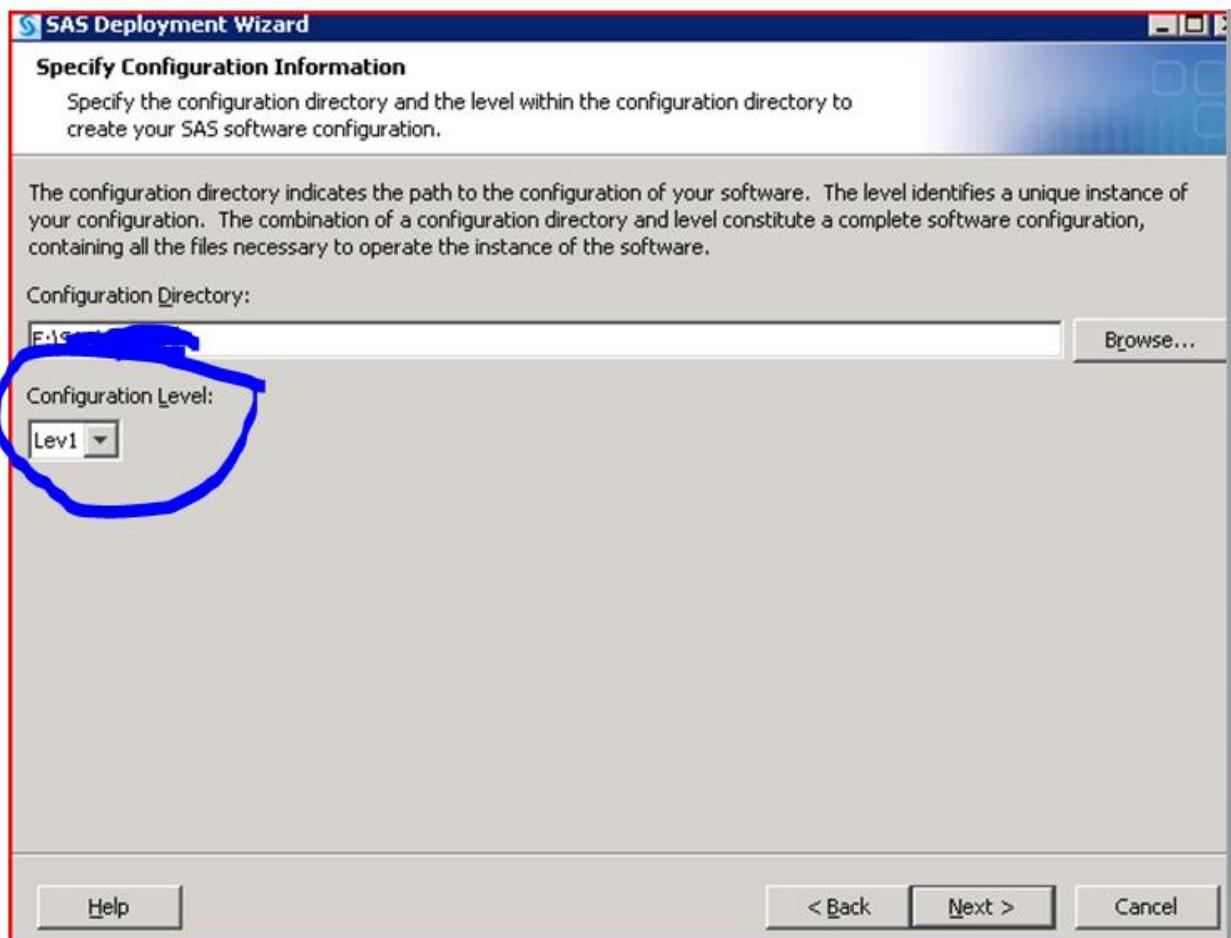


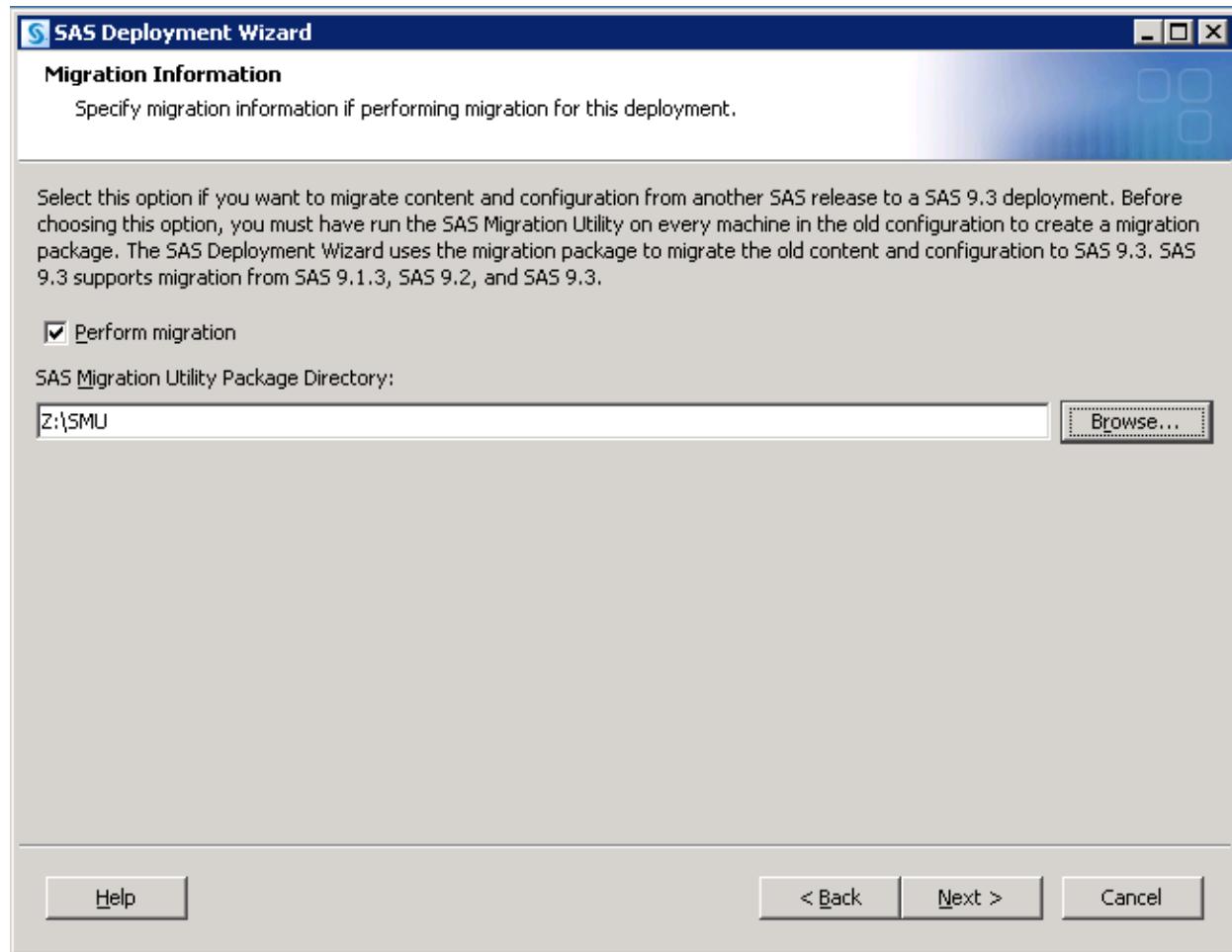
Figure 5. SMU-package can be reused many times also across servers.

## CONFIGURE

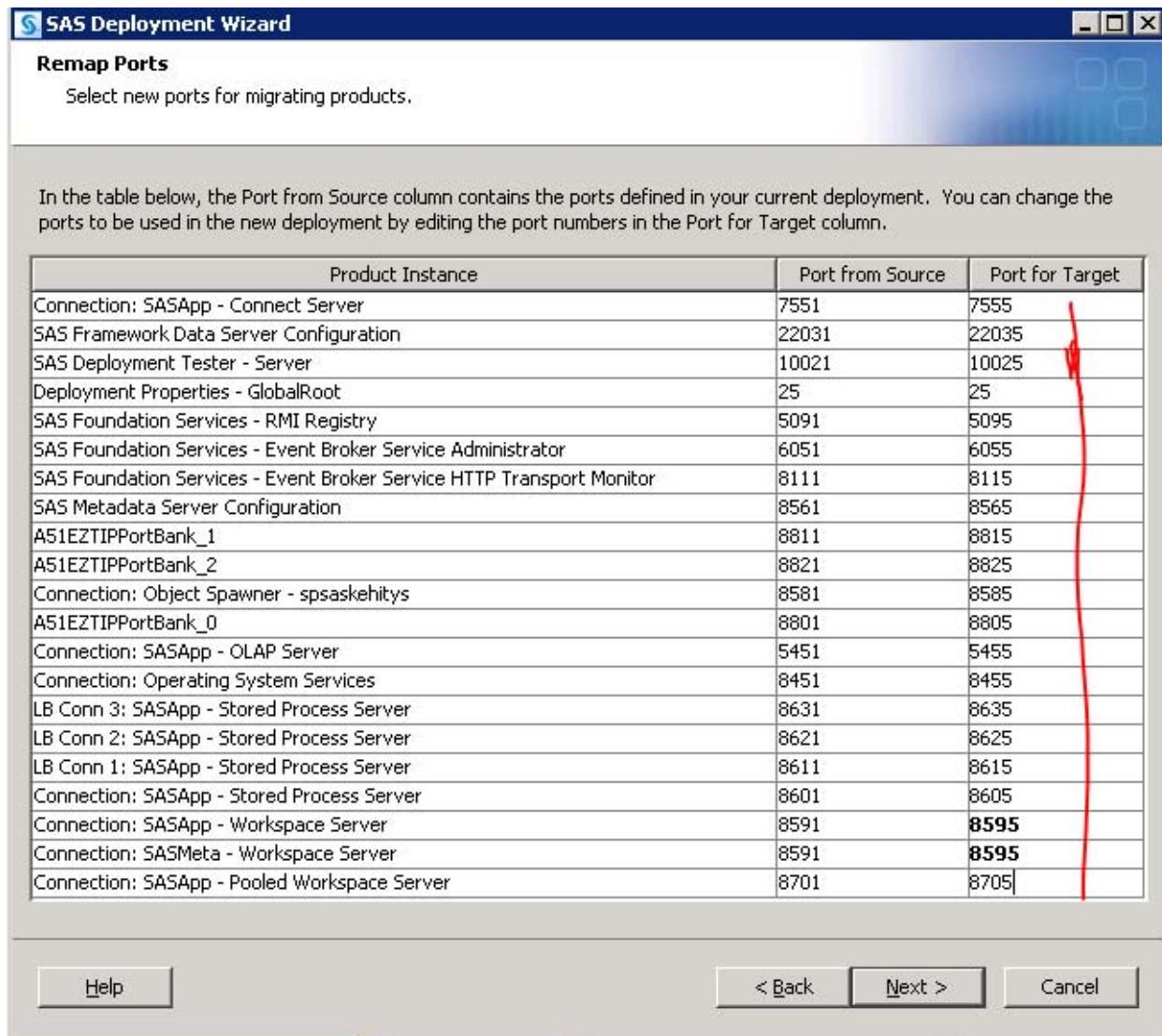
Configuration of metadata itself is not the focus of this presentation. You can run the configuration process as usual. However, there are some important selections you must pay attention to. These are described on Display 2, Display 3 and Display 4.



Display 2. Choose Configuration Level that you are going to create.



Display 3. Select “Perform migration” and point to the directory of your SMU-package.



Display 4. Remap Ports for Target. For example from Lev1 to Lev5 (ports end with 5).

## POST-CONFIGURE

You must finalize the new environment including physical paths of libraries. You have to

1. Create physical structure for the libraries on disk
2. Replace the older definitions in metadata

If you fail to do this, the new metadata points to the same libraries as previous metadata.

Use SAS Management Console to check that Servers and Libraries have appropriate paths and prepare them if it is necessary. Or you can do this more easily running a batch code. For example, the following code will change paths of two libnames (Data and Rawdata) by adding \Lev3\ to the physical paths. For instance, if directory for Data libref was X:\Data it will be replaced with X:\Lev3\Data.

```
%let LibList='DATA' 'RAWDATA';
DATA _null_;
length LibUri SasLibUri $256;
length DirectoryName NewDirectoryName $1000 LibRef $8;
```

```

nobj=0;
n=1;
jrc=1;
drop nobj n jrc rc;
do while(jrc>0);
  LibUri='';
  jrc=metadata_getnobj("omsobj:Directory?@DirectoryRole ='LibraryPath'",n,LibUri);
  DirectoryName='';
  rc=metadata_getattr(LibUri,"DirectoryName",DirectoryName);
  DirectoryName=upcase(DirectoryName);
  SasLibUri='';
  rc=metadata_getnasn(LibUri,"UsedByPackages",1,SasLibUri);
  LibRef='';
  rc=metadata_getattr(SasLibUri,"LibRef",LibRef);
  if upcase(LibRef) in (&LibList) then
    do;
      NewDirectoryName=tranwrd(DirectoryName,
        strip(upcase(LibRef)), "\Lev3\"!strip(LibRef));
      if ^indexw(DirectoryName,'LEV3',' ') then
        rc=metadata setattr(LibUri,"DirectoryName",NewDirectoryName);
      end;
    n=n+1;
  end;
run;

```

If you have to make any user defined configurations, be sure to change only these files: autoexec\_usermods.sas and/or sasv9\_usermods.cfg. They can be found under the correspondent Lev directory.

## CONCLUSION

There may be many reasons for having to multiply metadata environments either on the same server or on separate servers. This can even happen due to reasons that are outside of the normal BI realm.

Fortunately SAS has a straightforward process to build identical environments based on an existing one. This process is reliable and simple to use if you have some experience of the architecture of the SAS Intelligence Platform.

I highly recommend its use!

## RECOMMENDED READING

- *SAS® 9.3 Intelligence Platform: Installation and Configuration Guide*
- *SAS® 9.3 Intelligence Platform: Migration Guide*

## CONTACT INFORMATION

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

Jouni Javanainen  
 Aureolis Oy  
 Hevoskenkä 3  
 FI-02600 Espoo, Finland  
 Phone: +358 40 842 2899  
 E-mail: [Jouni.Javanainen@Aureolis.com](mailto:Jouni.Javanainen@Aureolis.com)  
[www.aureolis.com](http://www.aureolis.com)

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.