NETBACKUP FOR SYBASE

Sybase database backup and restore using Netbackup

Abstract

Simplified Step by Step Guide for Sybase Database Backup and Restore using Netbackup

Ahmed Atef

Ahmed.Atef@intercom.com.eg

Contents

About Netbackup for Sybase 3
Summary about this Guide 3
Responsibilities 4
Netbackup Administrator 4
Sybase database Administrator 4
Planning and Deploying the Solution 5
Sybase Database Version and OS level 6
Get Sybase Database Version using Isql 6
Get Sybase Database Version using DBIsql 7
Get OS Level 10
Sizing for Sybase Backup 11
Get Sybase Database Size using Isql 11
Get Sybase Database Size using DBIsql 13
Sybase Environment Variables 16
Get the Sybase Server name 16
Get the Sybase home directory 17
Netbackup Deployment and Configuration 18
Installing Netbackup Client 18
Configuring Netbackup Client 24
Backup Sybase database 26
Creating Backup Scripts 26
Coping the scripts 26
Editing Backup Script 27
Creating Backup Policies 38
Database Backup Policy 38
Configuration files Backup Policy 42
Restore Sybase Database 46
Listing Backups and Creating Scripts 46
Listing available backups 47
Editing the restore script 48
Editing the load script 52
Creating a database for restore 59

Creating Database using Isql 59
Creating Database using DBIsql 61
Initiating the Restore and Monitoring 64
Initiating the Restore 64
Monitoring the restore using terminal 65
Monitoring the restore using NBU GUI 66
Troubleshooting 67

About Netbackup for Sybase

As a Market leader Netbackup Provides a heterogeneous backup solution for large scale data centers, This includes Sybase database support, which provides centralized backup and restore solution for all your Sybase database servers using the same storage used for all your other backups optimizing your backup storage usage, also providing transparent backup and restore for the Sybase database admin using his own tools Isql or DBIsql for both backup and restore.

Summary about this Guide

This Guide is written to simplify the backup and restore of Sybase database using Netbackup, Defining responsibilities of both the Backup administrator and the Sybase database administrator, Explaining at a low leveled details a complete scenario for backup and restore of Sybase database using Netbackup.

This guide is for those who administer Netbackup on an environment that contains one or more Sybase database servers, Or a Sybase database administrators who are riddled by the amount of Sybase servers on their environment that need to be backed up and secured.

Note this Guide is prepared using Netbackup 7.7.1 on windows and Sybase database ASE 16 on Linux, it may be inappropriate for your environment if you are using different versions, so please review your version documentation to see if there is any new features or changes.

Responsibilities

Whenever it comes to responsibilities conflicts appears, and at this part of the document, I am going to clarify the scope of work based on the administrator role.

Netbackup Administrator

At this case the Netbackup administrator is responsible for planning the backup strategy with the Sybase database administrator, Providing the Netbackup Client Software with the prober version for the Sybase database environment, Installing and Configuring the Netbackup Client Software on Sybase database servers, Creating the Prober Backup Policies and Schedules according to the plan, Monitoring backup and restore jobs status, training the database administrator on how to restore a Sybase database in case of corruption or data loss and troubleshoot any problems related to the backup or restore jobs.

Sybase database Administrator

At this case the Sybase database administrator is responsible for providing Sybase database environment variables, Providing the prober backup schedules, retention periods and type of backup, Creating databases for restores and restoring databases.

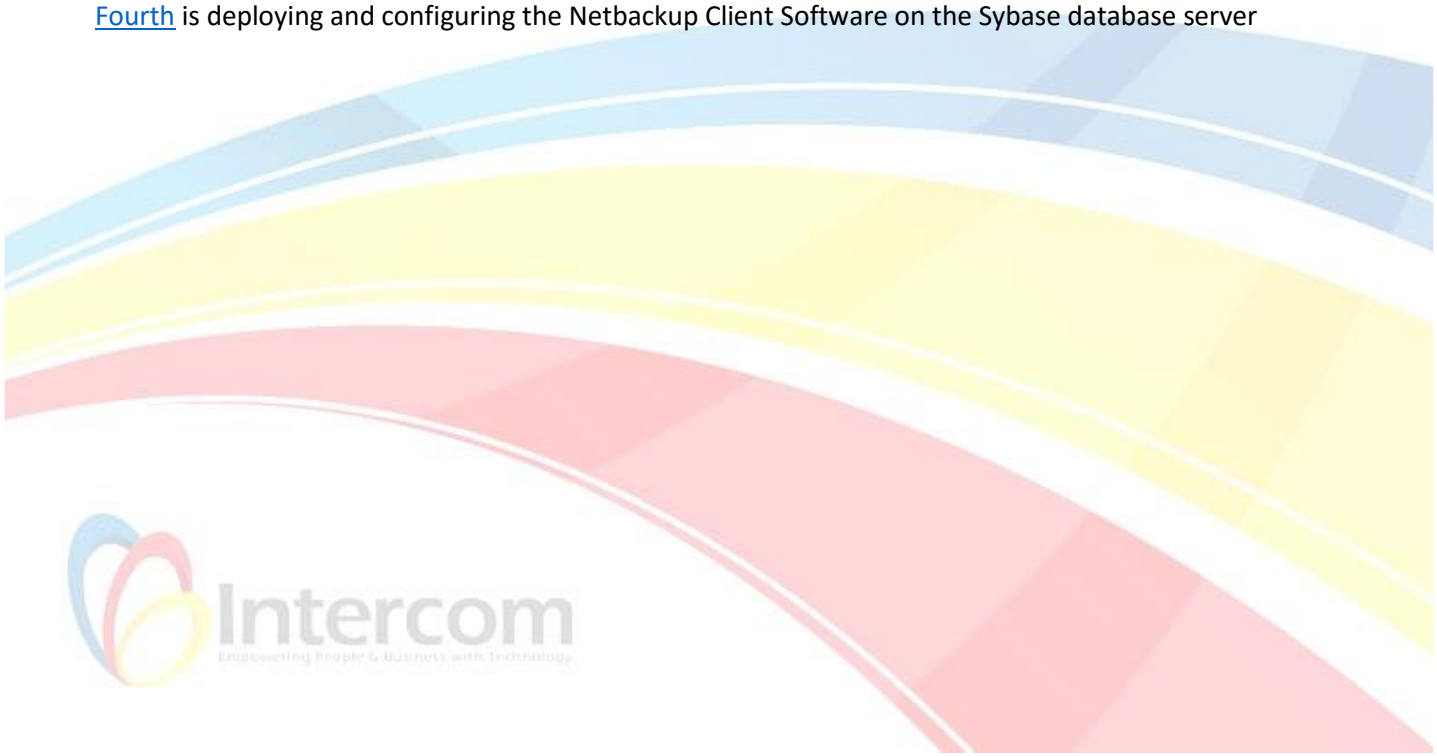
Planning and Deploying the Solution

First thing first what version of Netbackup Client is compatible with your Sybase database version and OS, here comes the Sybase database administrator and provide the Netbackup administrator with the Sybase database version and OS level.

Second for sizing you will need to know the size of the Sybase databases that you need to backup and how long it will be retained at what frequency of backup, here comes the Sybase database administrator and provide the Netbackup administrator with the database sizes.

Third and before deployment of Netbackup Client Software we need to get both Sybase server name and Sybase home directory.

Fourth is deploying and configuring the Netbackup Client Software on the Sybase database server



Sybase Database Version and OS level

The Sybase database administrator provides the Sybase database version by using one of those to methods.

Using the provided data the Netbackup Administrator will check “Netbackup Compatibility Matrix” and prepare the prober Netbackup Client Software version source.

Get Sybase Database Version using Isql

From Terminal the Sybase Database Administrator will Change directory to /opt/sap/OCS-16_0/bin/ assuming that Sybase home is /opt/sap/

Then he will connect to the Sybase database server using ./isql –Usa –SSAP assuming that the Sybase database server name is SAP

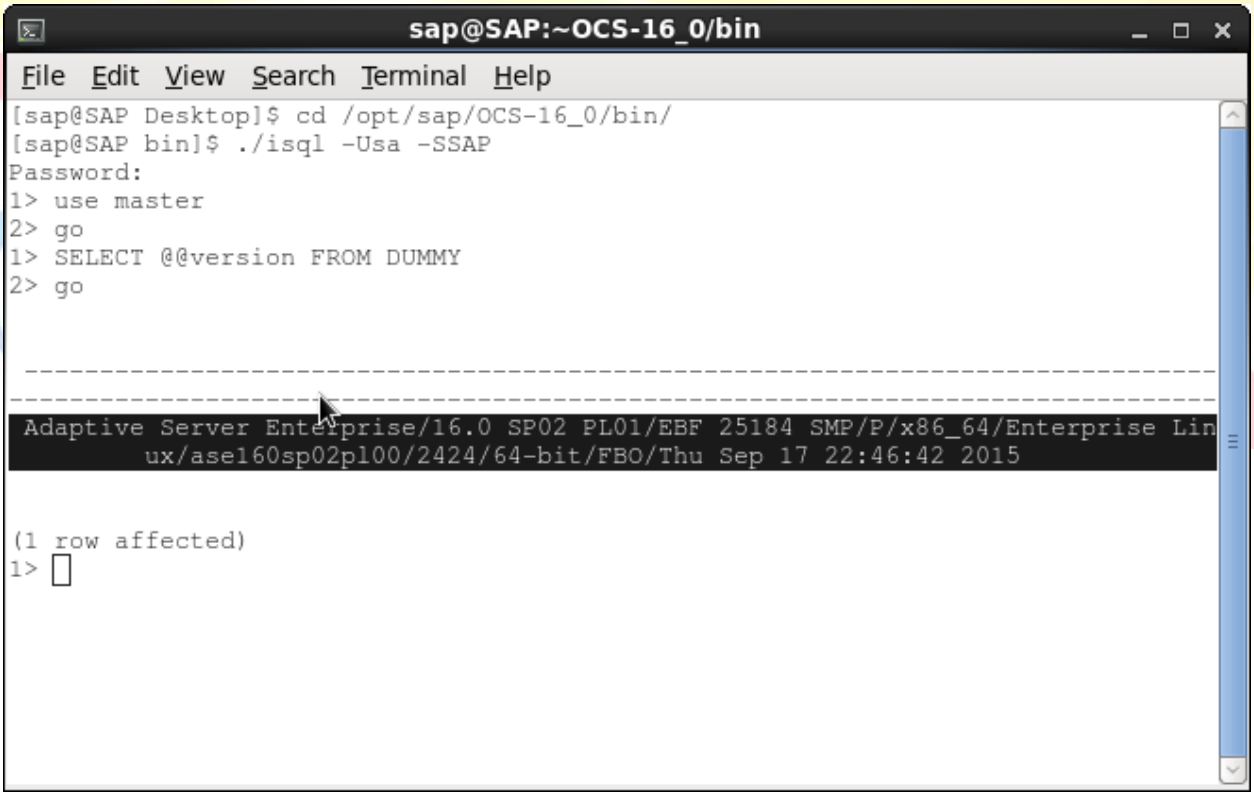
After connecting and entering the password the following query should be used

use master

go

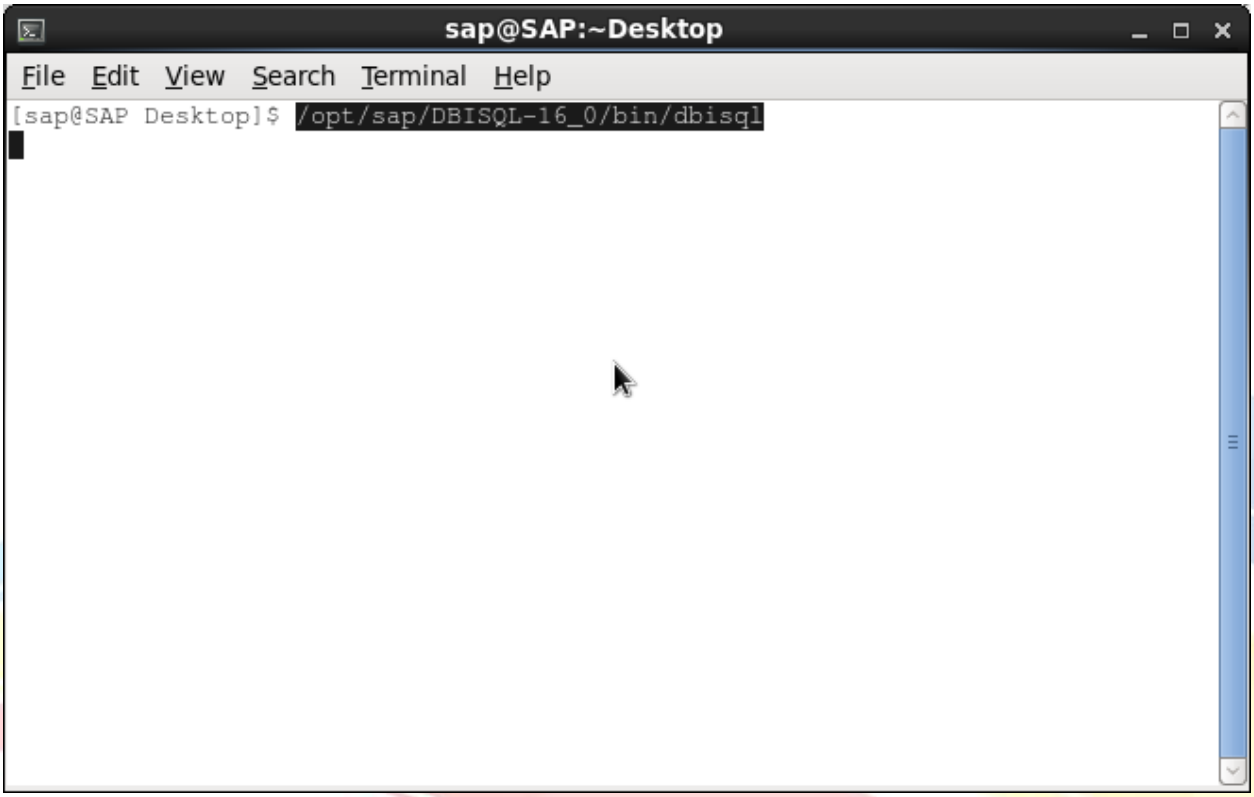
select @@version FROM DUMMY

go

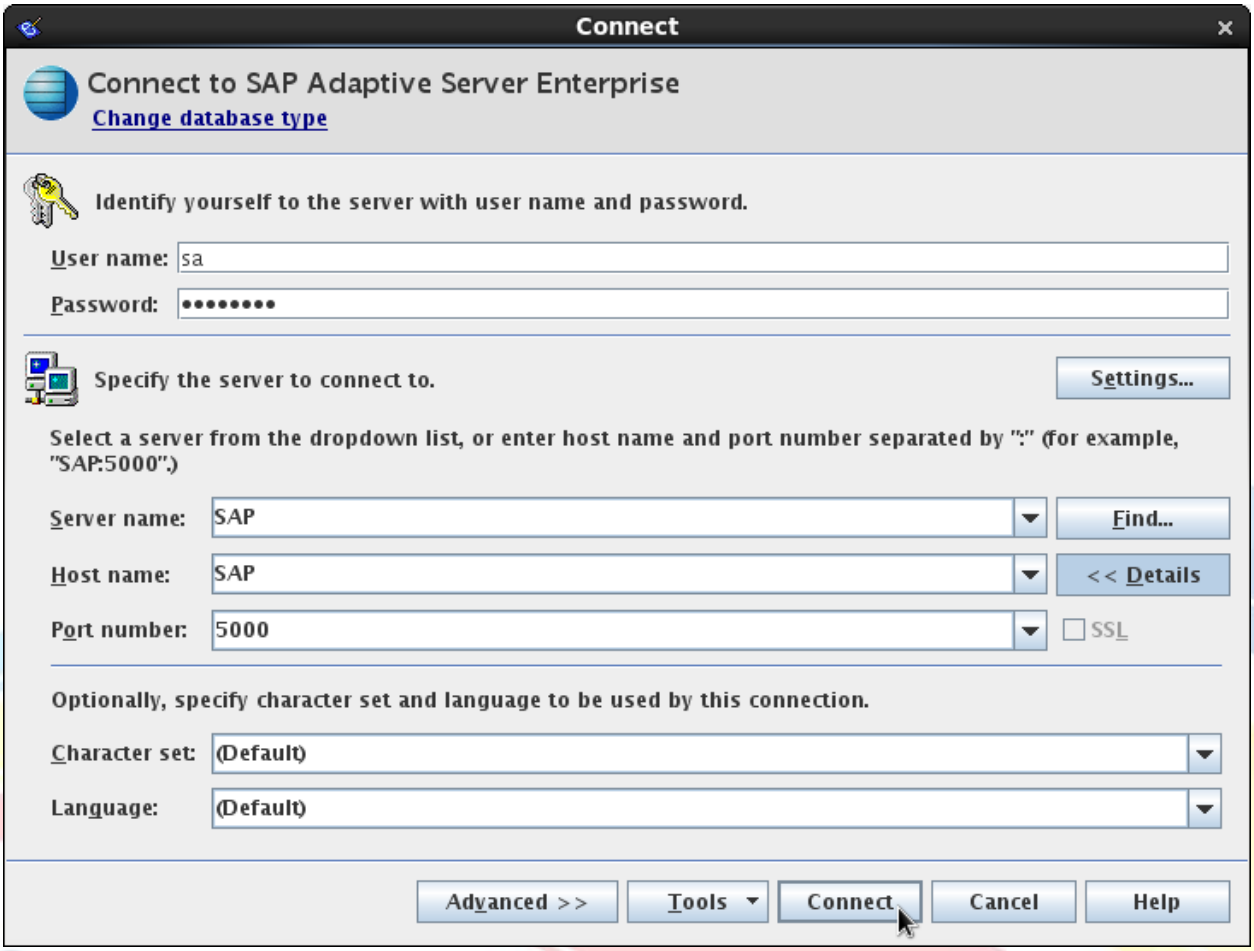


Get Sybase Database Version using DBIsql

From Terminal the Sybase Database Administrator will run /opt/sap/DBISQL-16_0/bin/dbisql assuming that Sybase home is /opt/sap/



Then enters the prober user name and password to connect to the Sybase database server



After a successful login the following query will be used

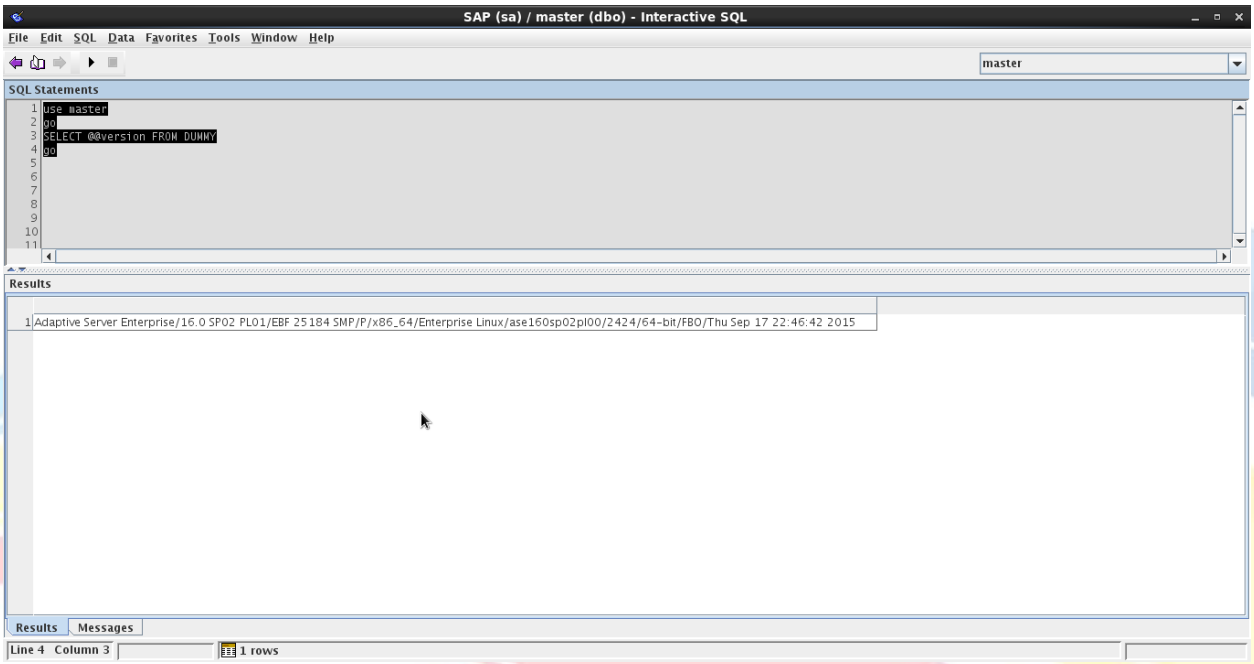
Use master

Go

Select @@version FROM DUMMY

Go

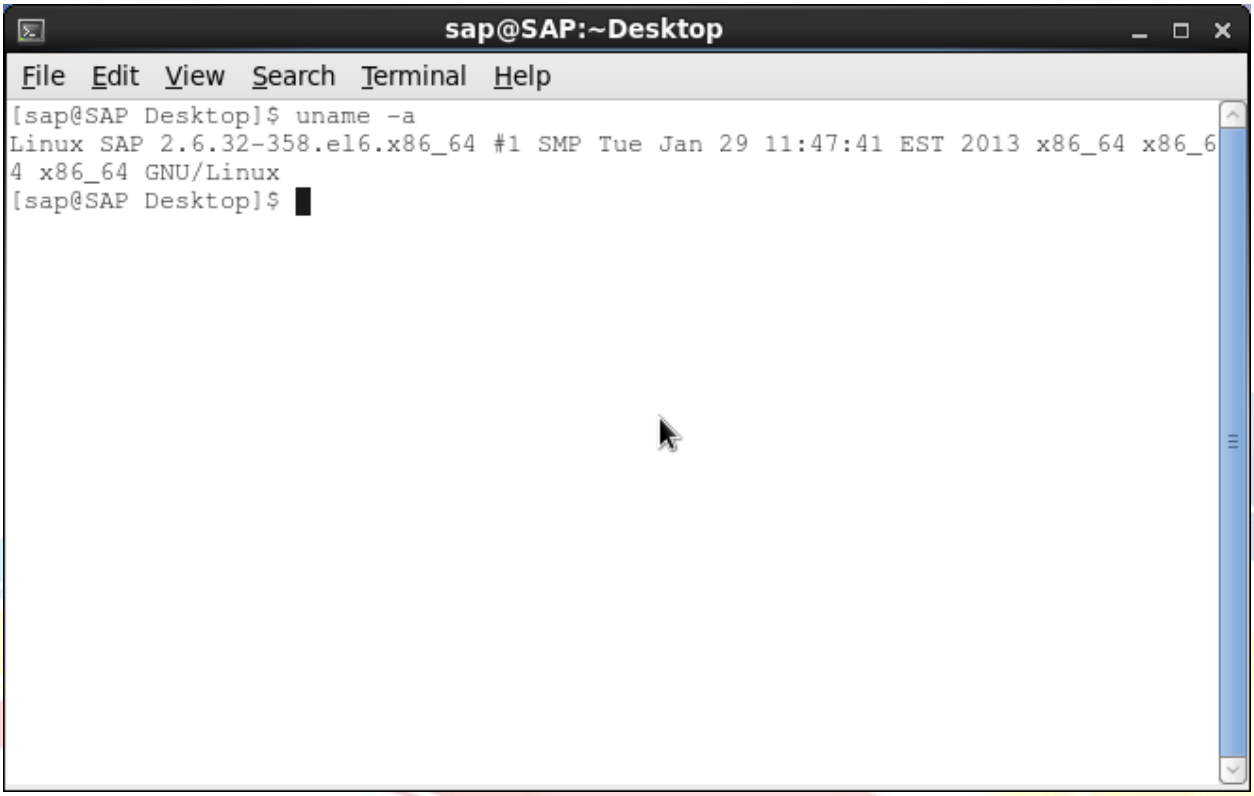
F5 key to execute



Get OS Level

Using terminal the Sybase database administrator executes the following command

"uname –a"



Sizing for Sybase Backup

As part of planning you need to know how large are the data going to be backed up and how long it will be retained at which frequency of backup.

At this part the Sybase database administrator will provide the Netbackup administrator with the required schedule of backup according to the business needs including both full database dump and transaction logs dump, also he will provide the required retention periods for every backup and the sizes of all databases to be backed up.

Also the Netbackup Administrator will have to calculate the required amount of storage using the data provided

Required Storage Size = DB size * (Number of Backups during the retention period)

Note from the following queries use the data_used and the log_used as your reference.

Get Sybase Database Size using Isql

From Terminal the Sybase Database Administrator will Change directory to /opt/sap/OCS-16_0/bin/ assuming that Sybase home is /opt/sap/

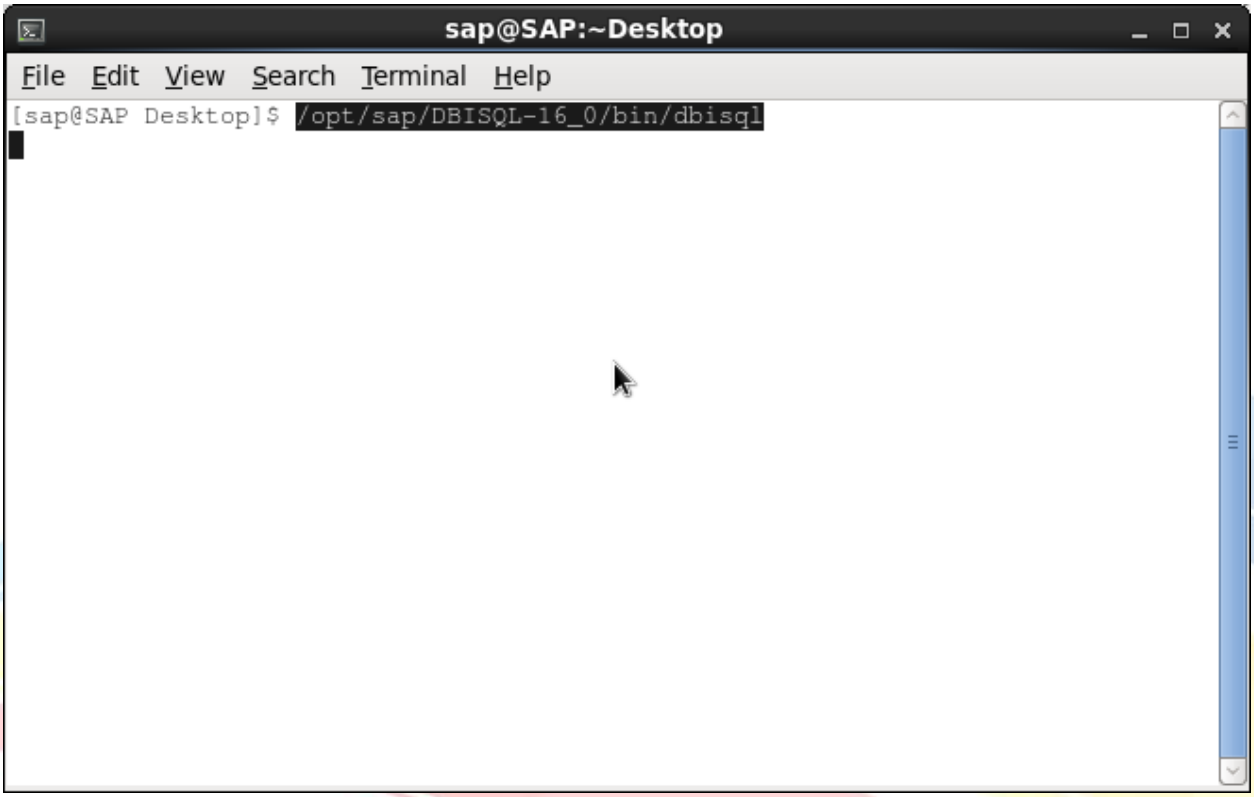
Then he will connect to the Sybase database server using ./isql –Usa –SSAP assuming that the Sybase database server name is SAP

After connecting and entering the password the following query should be used

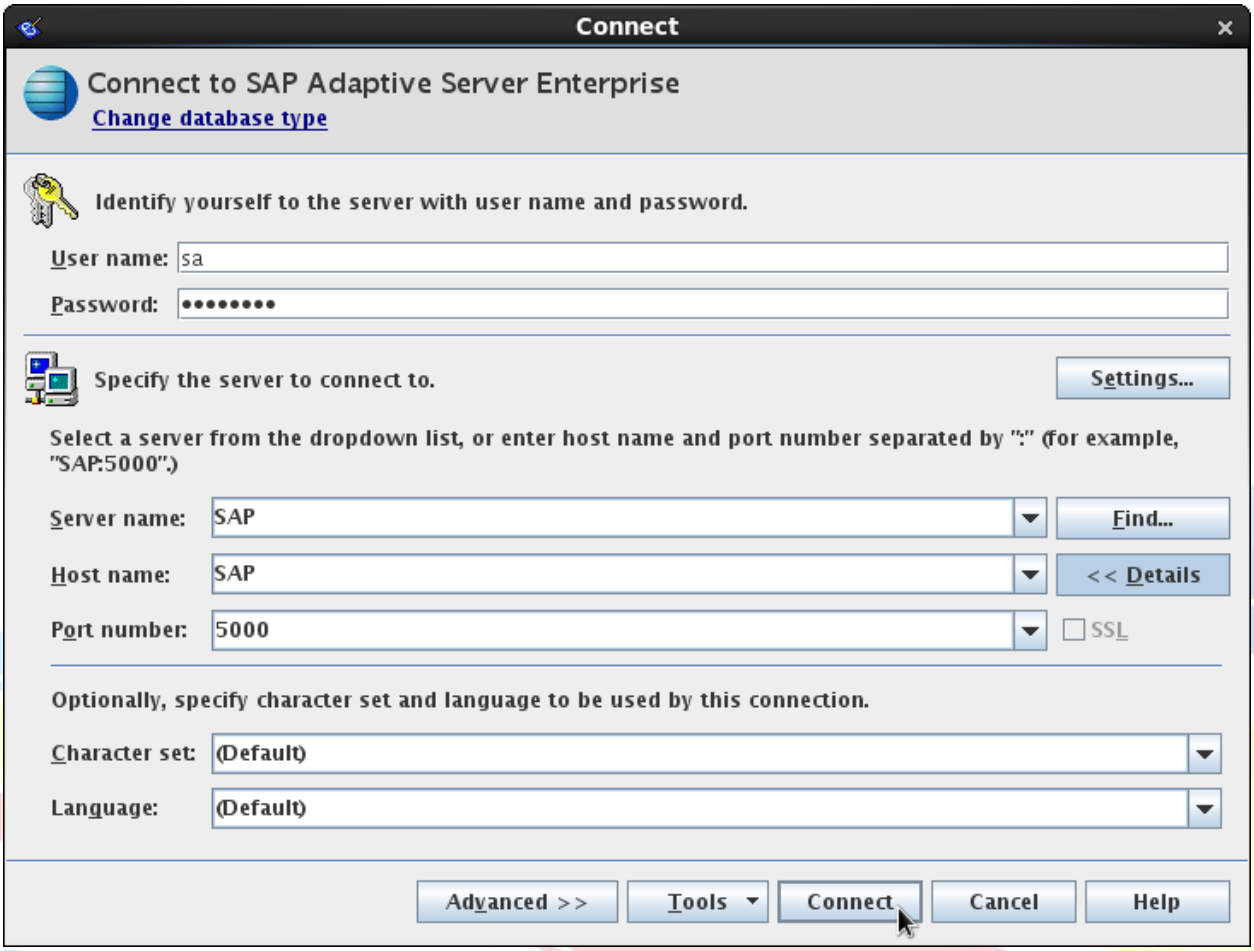
```
use master

go

select db_name(d.dbid) as db_name,

ceiling(sum(case when u.segmap != 4 then u.size/1048576.*@@maxpagesize end )) as data_size,

ceiling(sum(case when u.segmap != 4 then size - curunreservedpgs(u.dbid, u.lstart, u.unreservedpgs) end)/1048576.*@@maxpagesize) as data_used,

ceiling(100 * (1 - 1.0 * sum(case when u.segmap != 4 then curunreservedpgs(u.dbid, u.lstart, u.unreservedpgs) end) / sum(case when u.segmap != 4 then u.size end))) as data_used_pct,

ceiling(sum(case when u.segmap = 4 then u.size/1048576.*@@maxpagesize end)) as log_size,

ceiling(sum(case when u.segmap = 4 then u.size/1048576.*@@maxpagesize end) -
lct_admin("logsegment_freepages",d.dbid)/1048576.*@@maxpagesize) as log_used,

ceiling(100 * (1 - 1.0 * lct_admin("logsegment_freepages",d.dbid) / sum(case when u.segmap in (4, 7) then u.size end))) as log_used_pct

from master..sysdatabases d, master..sysusages u

where u.dbid = d.dbid  and d.status != 256

group by d.dbid

order by db_name(d.dbid)

go
```

Get Sybase Database Size using DBIsql

From Terminal the Sybase Database Administrator will run /opt/sap/DBISQL-16_0/bin/dbisql assuming that Sybase home is /opt/sap/



Then enters the prober user name and password to connect to the Sybase database server



After a successful login the following query will be used

use master

go

select db_name(d.dbid) as db_name,

ceiling(sum(case when u.segmap != 4 then u.size/1048576.*@@maxpagesize end)) as data_size,

ceiling(sum(case when u.segmap != 4 then size - curunreservedpgs(u.dbid, u.lstart, u.unreservedpgs) end)/1048576.*@@maxpagesize) as data_used,

ceiling(100 * (1 - 1.0 * sum(case when u.segmap != 4 then curunreservedpgs(u.dbid, u.lstart, u.unreservedpgs) end) / sum(case when u.segmap != 4 then u.size end))) as data_used_pct,

ceiling(sum(case when u.segmap = 4 then u.size/1048576.*@@maxpagesize end)) as log_size,

ceiling(sum(case when u.segmap = 4 then u.size/1048576.*@@maxpagesize end) - lct_admin("logsegment_freepages",d.dbid)/1048576.*@@maxpagesize) as log_used,

ceiling(100 * (1 - 1.0 * lct_admin("logsegment_freepages",d.dbid) / sum(case when u.segmap in (4, 7) then u.size end))) as log_used_pct

from master..sysdatabases d, master..sysusages u

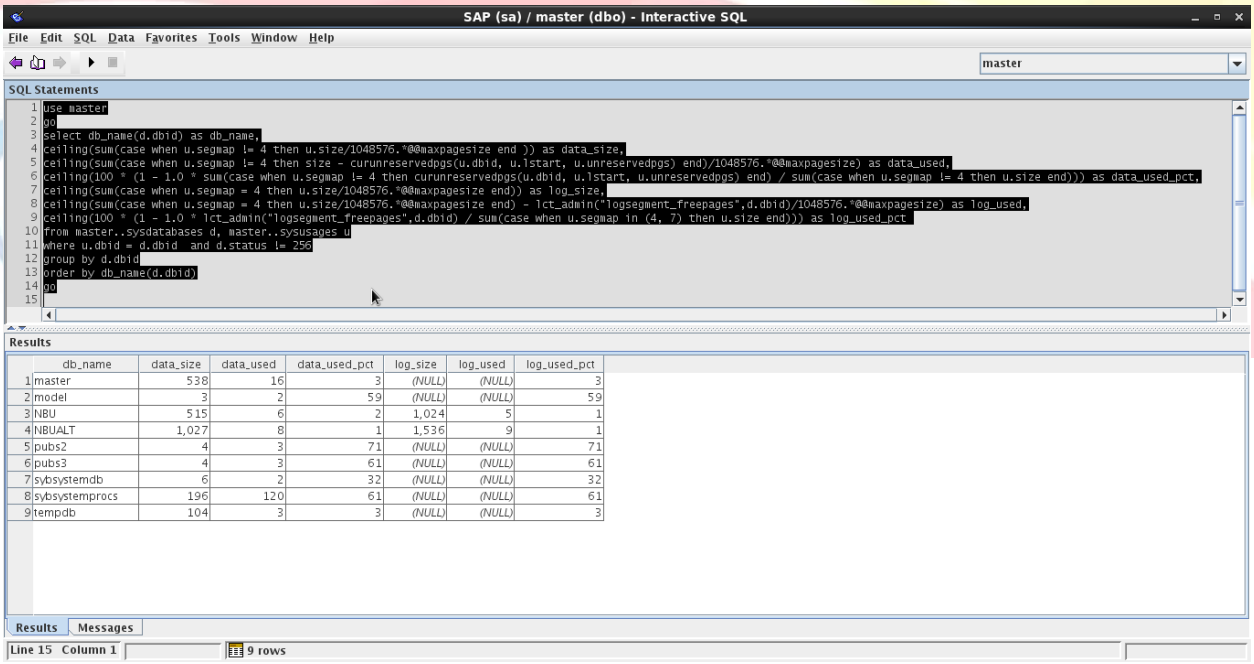
where u.dbid = d.dbid and d.status != 256

group by d.dbid

order by db_name(d.dbid)

go

F5 key to execute



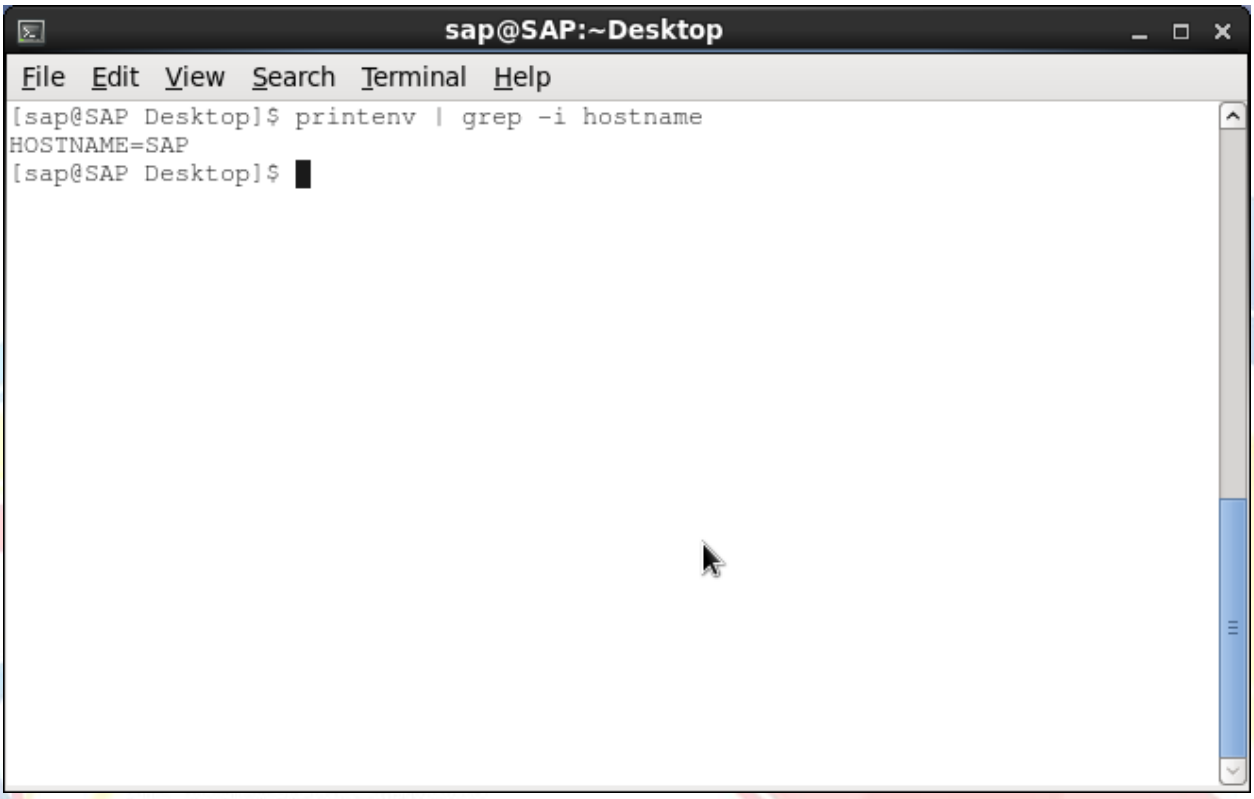
Sybase Environment Variables

Netbackup Client Software requires Sybase server name and Sybase home directory to be able to backup and restore the databases on the Sybase database server.

Get the Sybase Server name

Using terminal the Sybase database administrator executes the following command

printenv | grep –i hostname

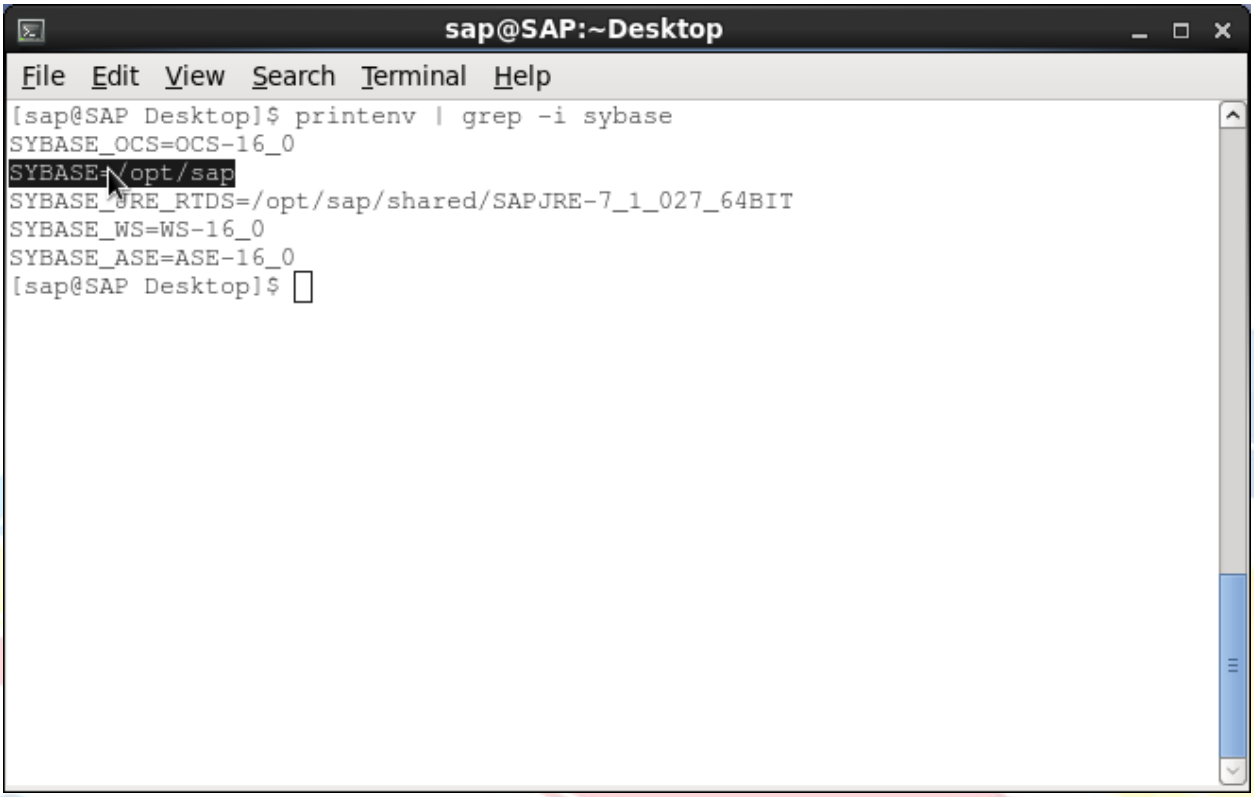


Get the Sybase home directory

Using terminal the Sybase database administrator executes the following command

printenv | grep –i Sybase

And look for the value next to SYBASE=??????



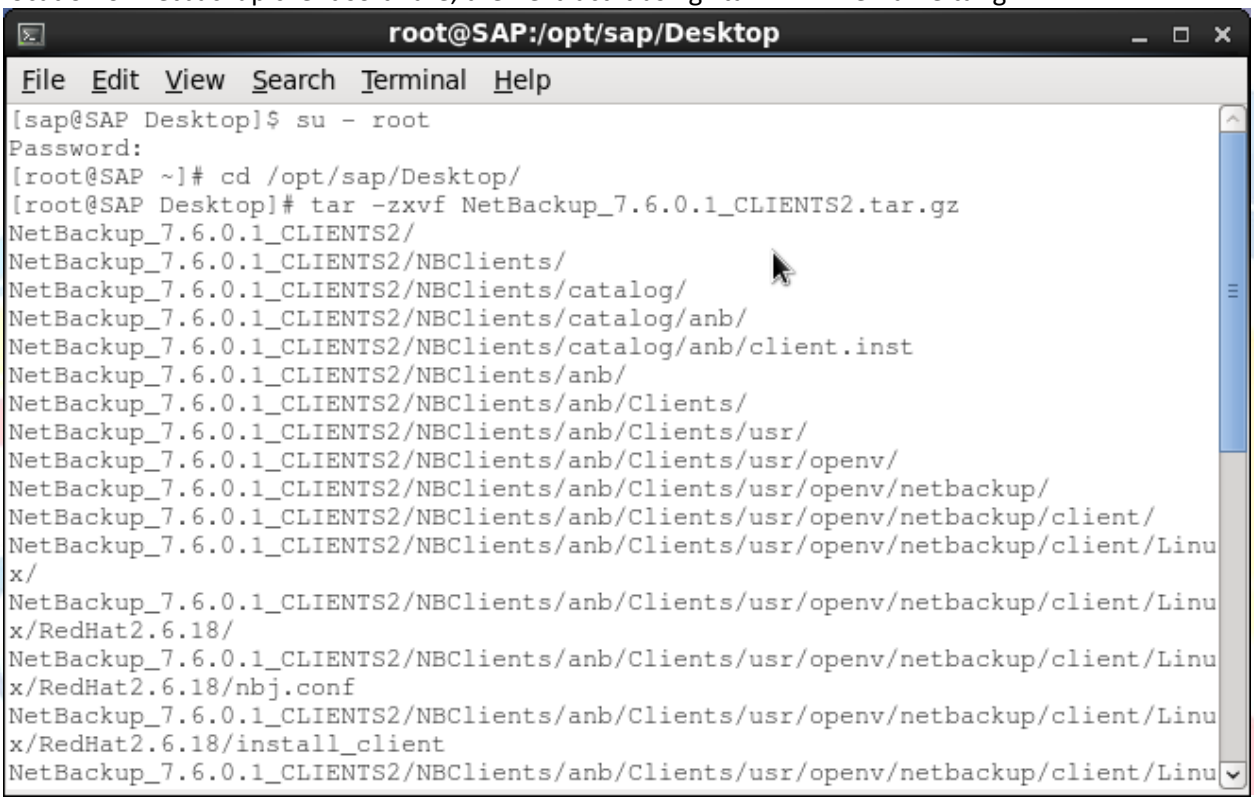
Netbackup Deployment and Configuration

At this part comes the Netbackup administrator and installs the Netbackup Client Software version compatible with the Sybase database version and OS level, then configures it and set it for Sybase instance/s.

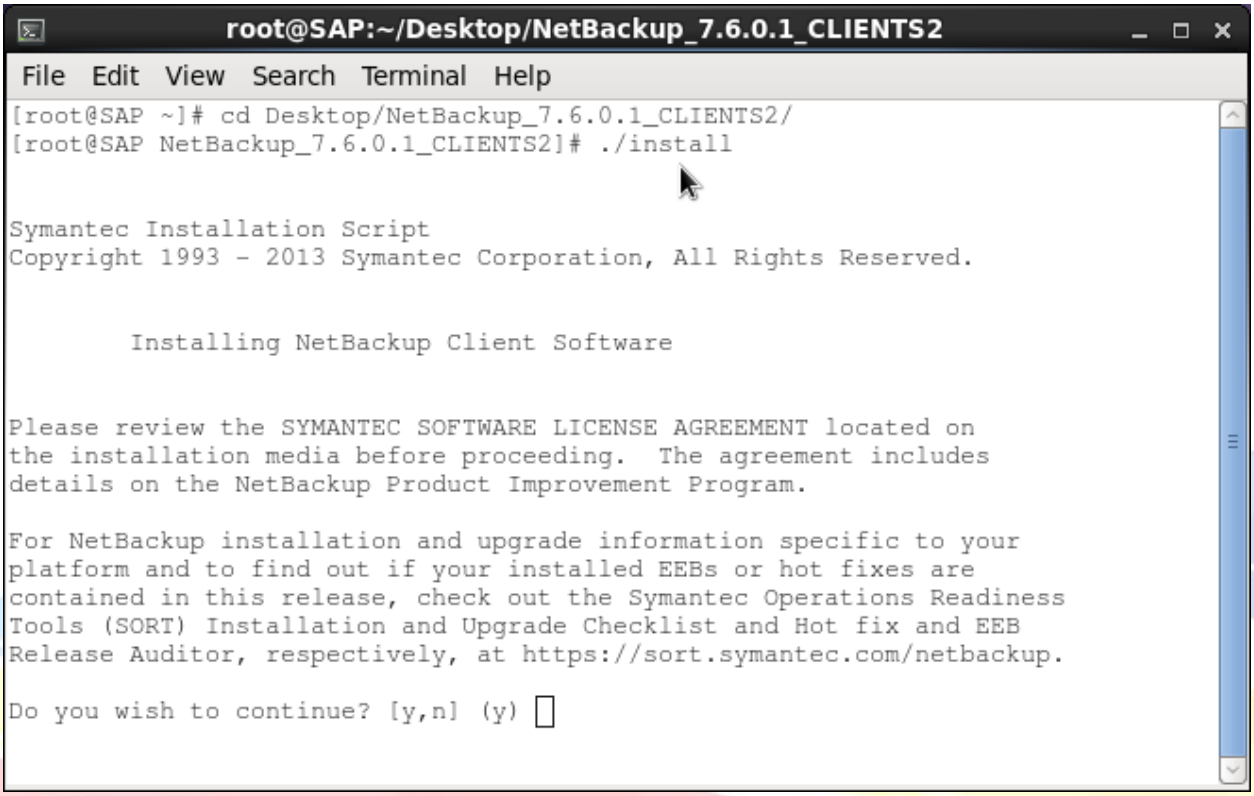
Installing Netbackup Client

Using terminal the Netbackup administrator will use root user to extract the Netbackup client software and install it.

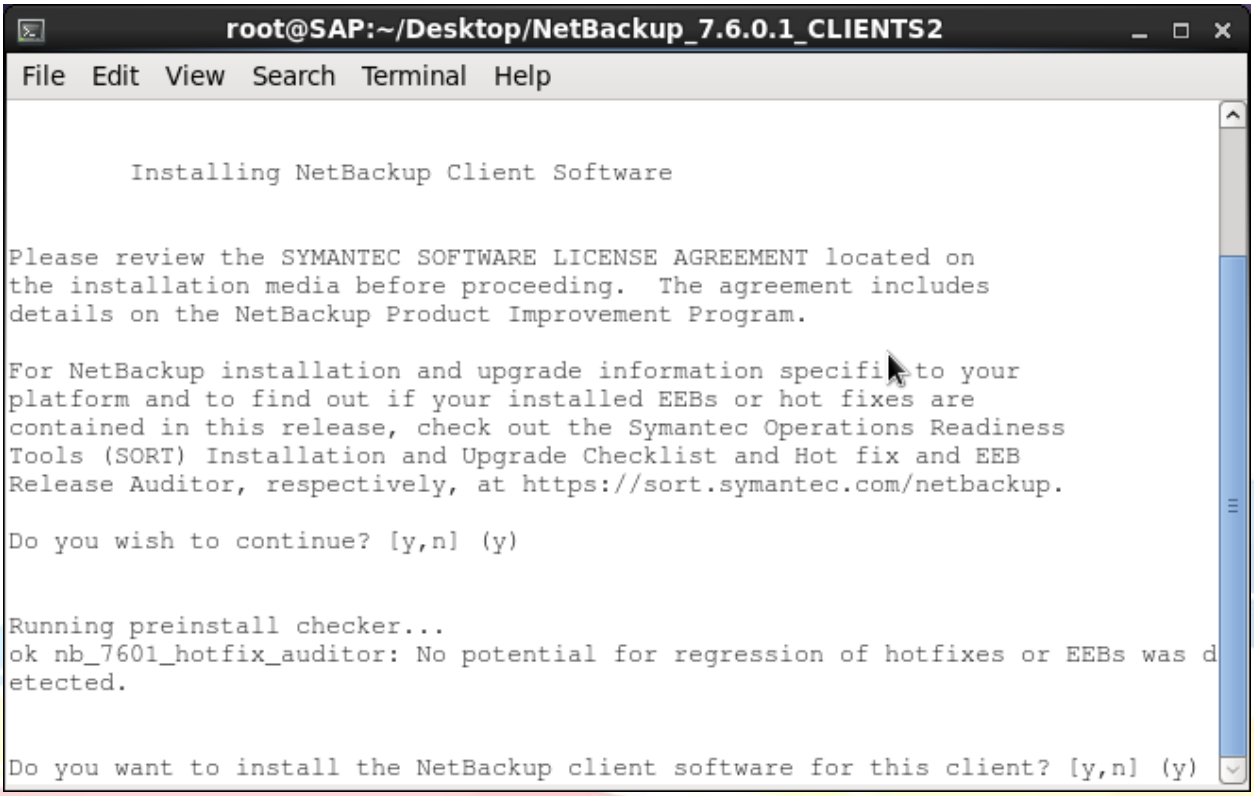
Run “su – root” and enter the root password to switch to the root user, then change directory to the location of Netbackup client software, then extract it using “tar –zxvf file-name.tar.gz”



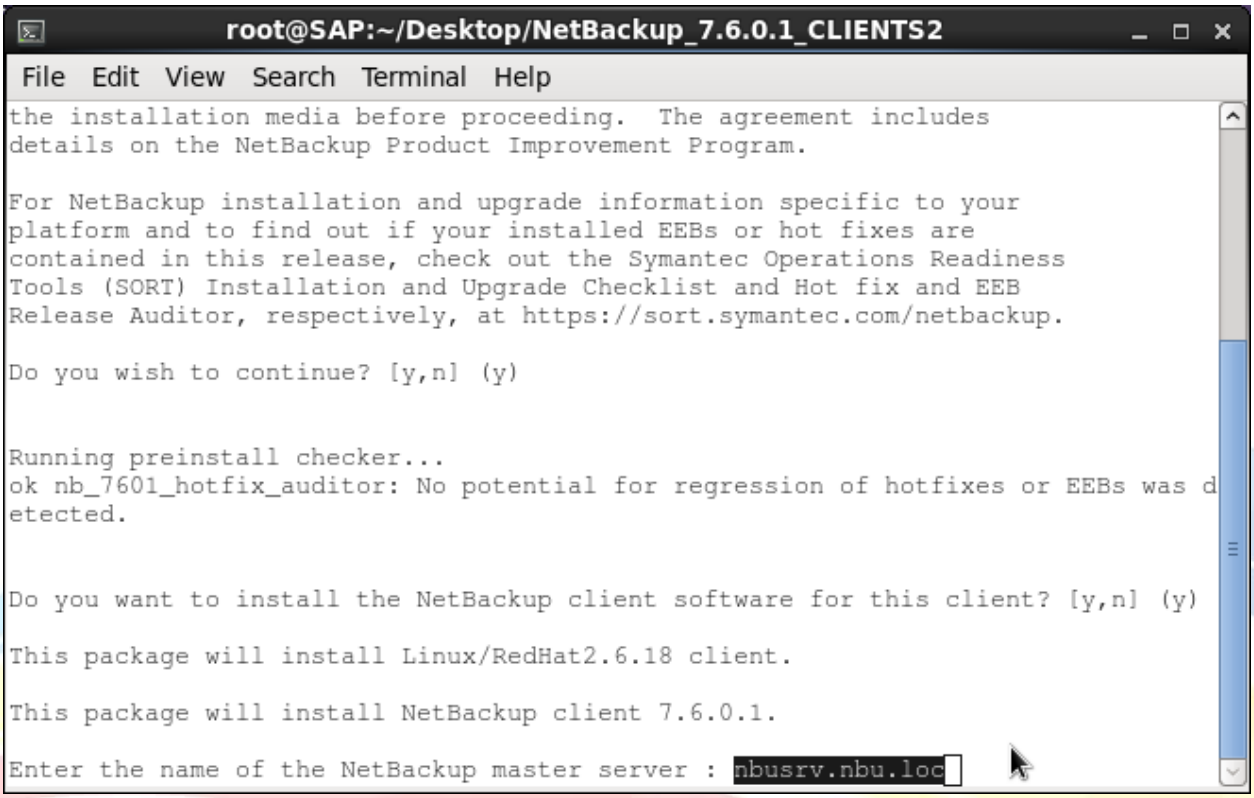
After the file is extracted change directory inside the directory extracted and run the "./install" to start the installation wizard, then input "Y" to continue with the installation wizard.



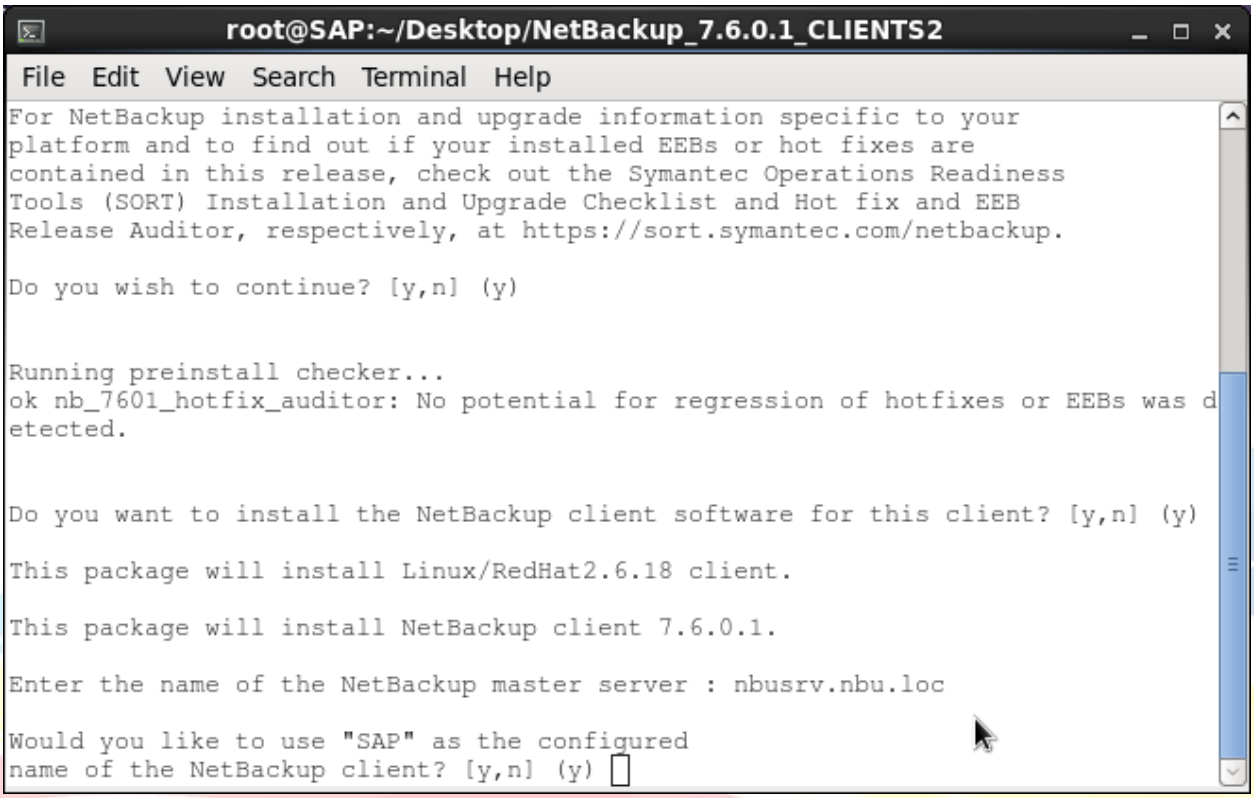
After the preinstall checker finishes input “Y” to continue with the installation wizard.



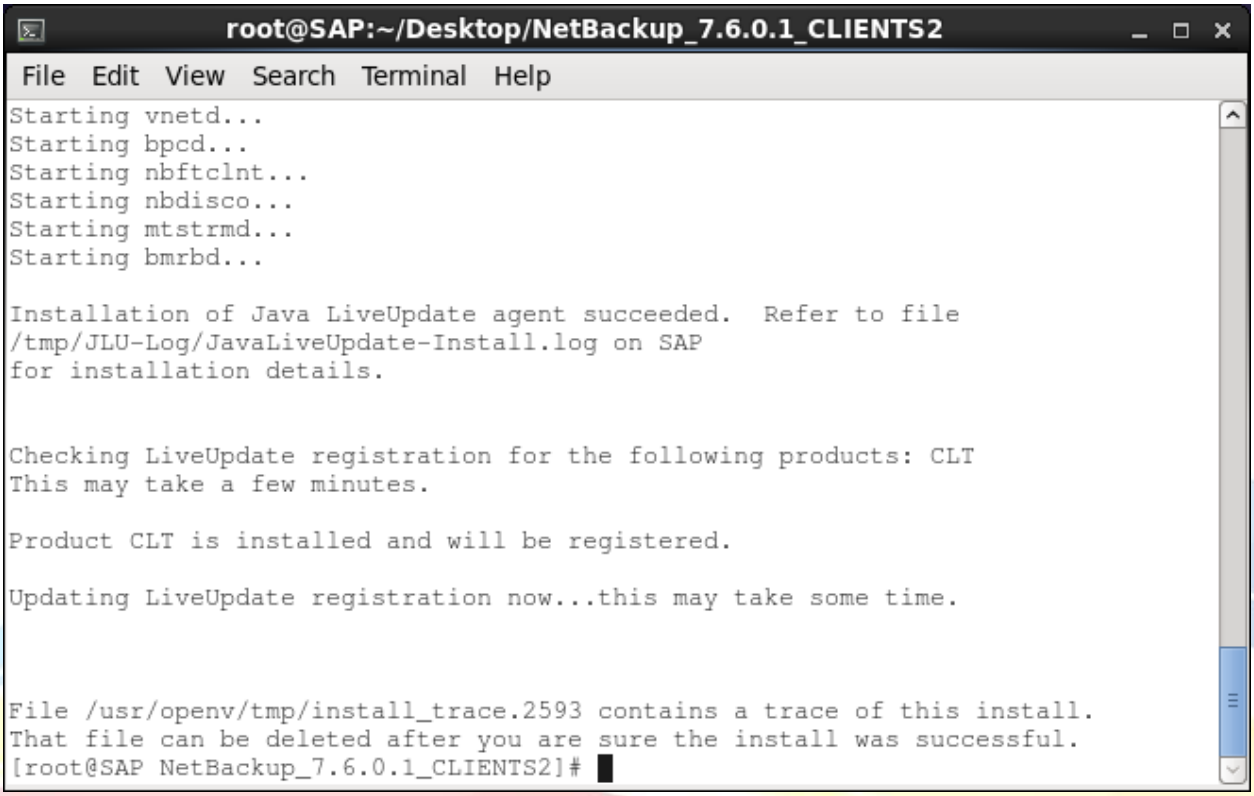
When the installation wizard prompts you for the Netbackup master server type in the name of your Netbackup master server and press enter.



When the installation wizard prompts you for the Netbackup client name make sure the name is correct and then input “Y” to continue with the installation.



After the installation ends review the installation progress and make sure there is no errors.



Configuring Netbackup Client

At this part the Netbackup administrator will copy a library file to the Sybase database server, create the log directories and register the Sybase database instance.

In case you are using windows then copy the following file from the Netbackup master server

"C:\Program Files\Veritas\NetBackup\DbExt\sybase\libsybackup.dll"

To the windows based Sybase database Server into

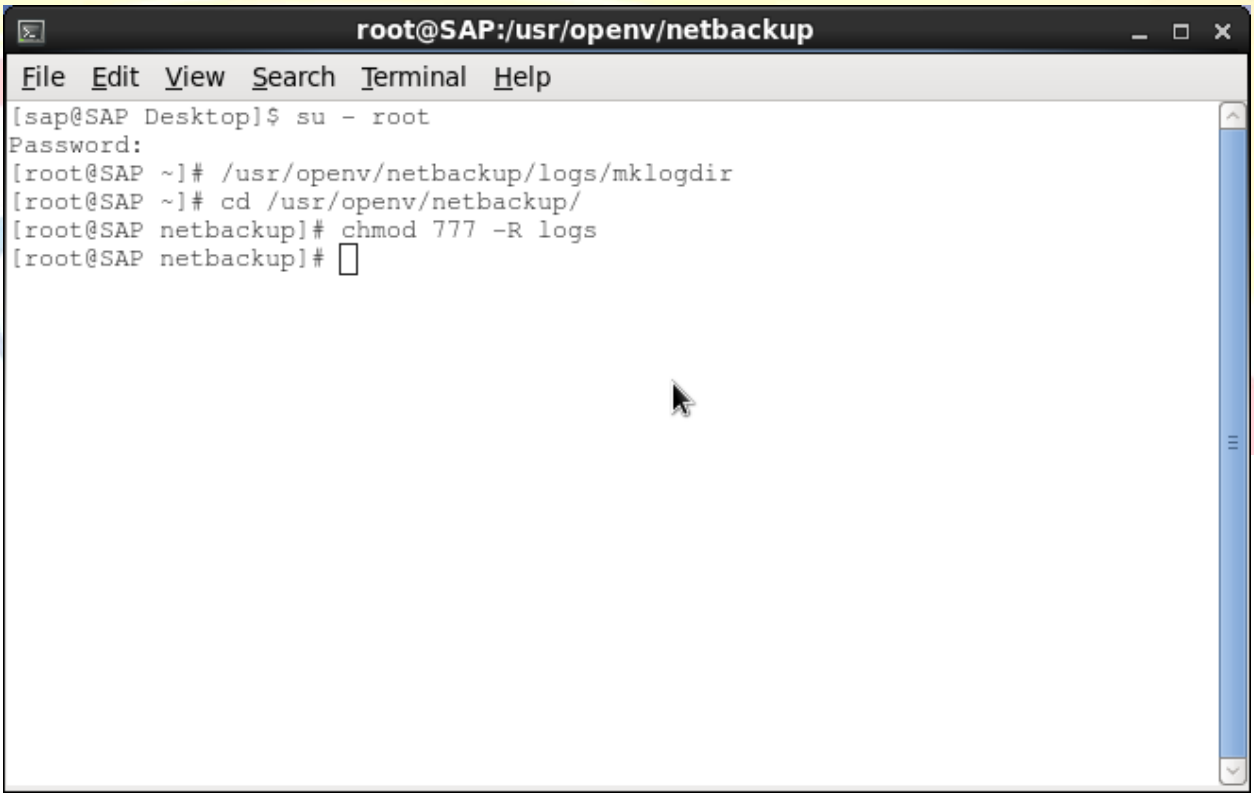
%SYBASE%\ASE-12_*\lib\

Assuming that you are using sybase ASE 12

Then create the log directories (log directories are mandatory for backup success)

Using terminal the Netbackup administrator will use root user to create the log directories

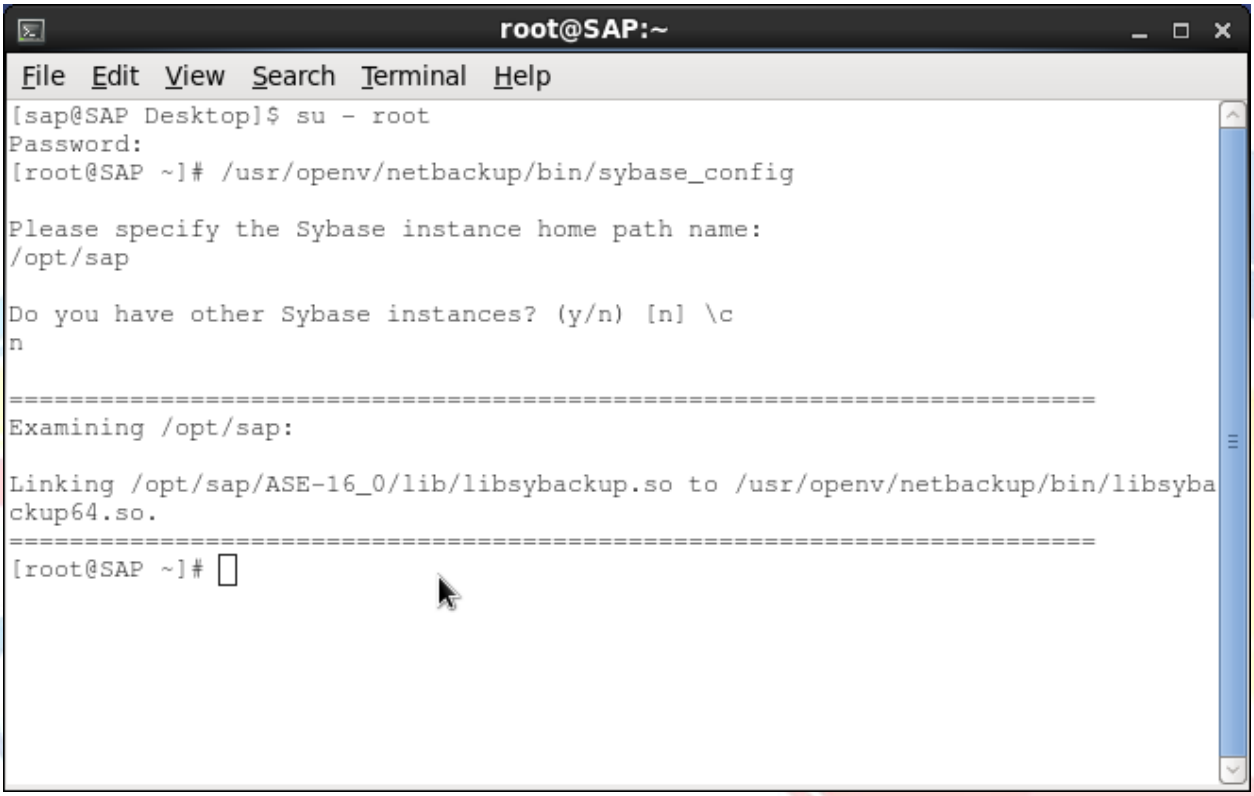
Run "su – root" and enter the root password to switch to the root user, then creates the log directories using "/usr/openv/netbackup/logs/mklogdir" and change directory to the location of Netbackup client software installation directory using "cd /usr/openv/netbackup/", and finally change the permissions of the logs directory using "chmod 777 –R logs"



After creating the logs you will need to configure NetBackup Client for the Sybase database instance.

Using terminal the NetBackup administrator will use root user to execute the following command

Run “su – root” and enter the root password to switch to the root user, then execute “/usr/openv/netbackup/bin/sybase_config”, And when it prompts you for the Sybase instance home path input “/opt/sap” assuming that Sybase home is /opt/sap/ then if you have any more instances input “Y” and input the home directory for every instance and when there is no more instances input “N” and you are done configuring Netbackup for Sybase database backup.



Backup Sybase database

The process of backup is simple and consists of two steps, creating backup scripts, then creating backup policies.

Creating Backup Scripts

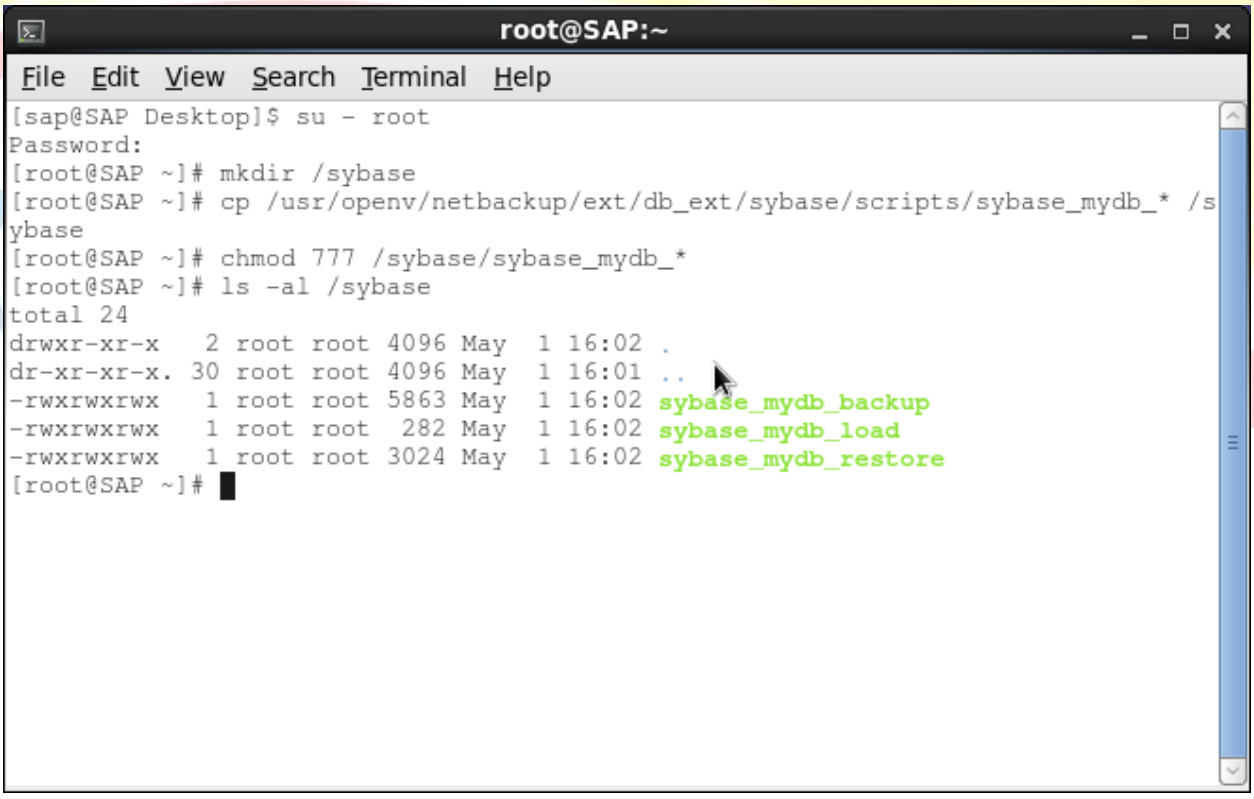
Creating a script may sound difficult but it is not really creating a script, you will just copy a template script for every database and edit it to suite your plan.

Coping the scripts

At this step the Netbackup administrator will use the root user to create a directory to store the backup scripts, copy them to it, and finally change their permissions to be executable.

Run “su – root” and enter the root password to switch to the root user, then creates the scripts directory running “mkdir /sybase”, then copies the scripts running “cp /usr/openv/netbackup/ext/db_ext/sybase/scripts/sybase_mydb_* /sybase” , and finally change the permissions of the copied scripts running “chmod 777 /sybase/sybase_mydb_*”.

Note according to the security policy you may be using 775 to prevent normal users from executing the scripts.



Editing Backup Script

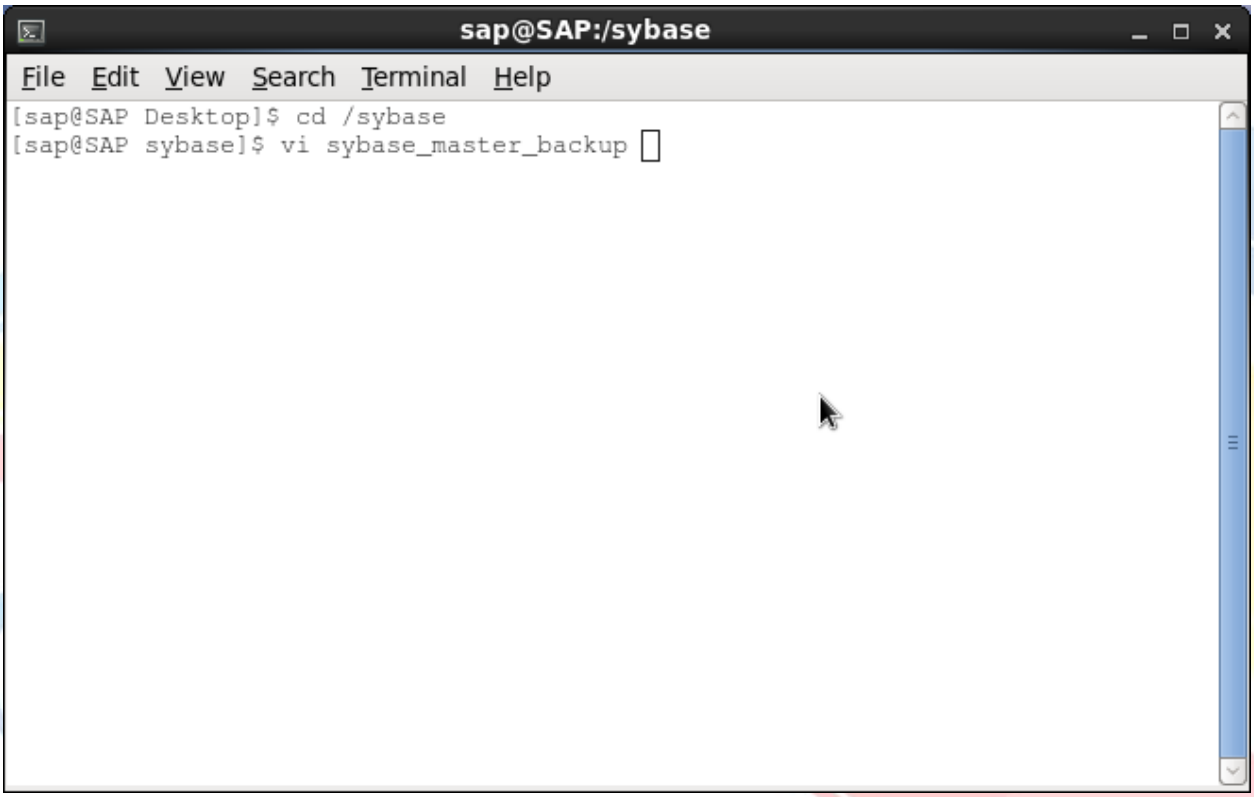
First you will have to copy a backup script for every database renaming it to a prober name to help you knowing the purpose of the file.

Example. Sybase_”database name”_”Operation (Backup/ restore/ load)”

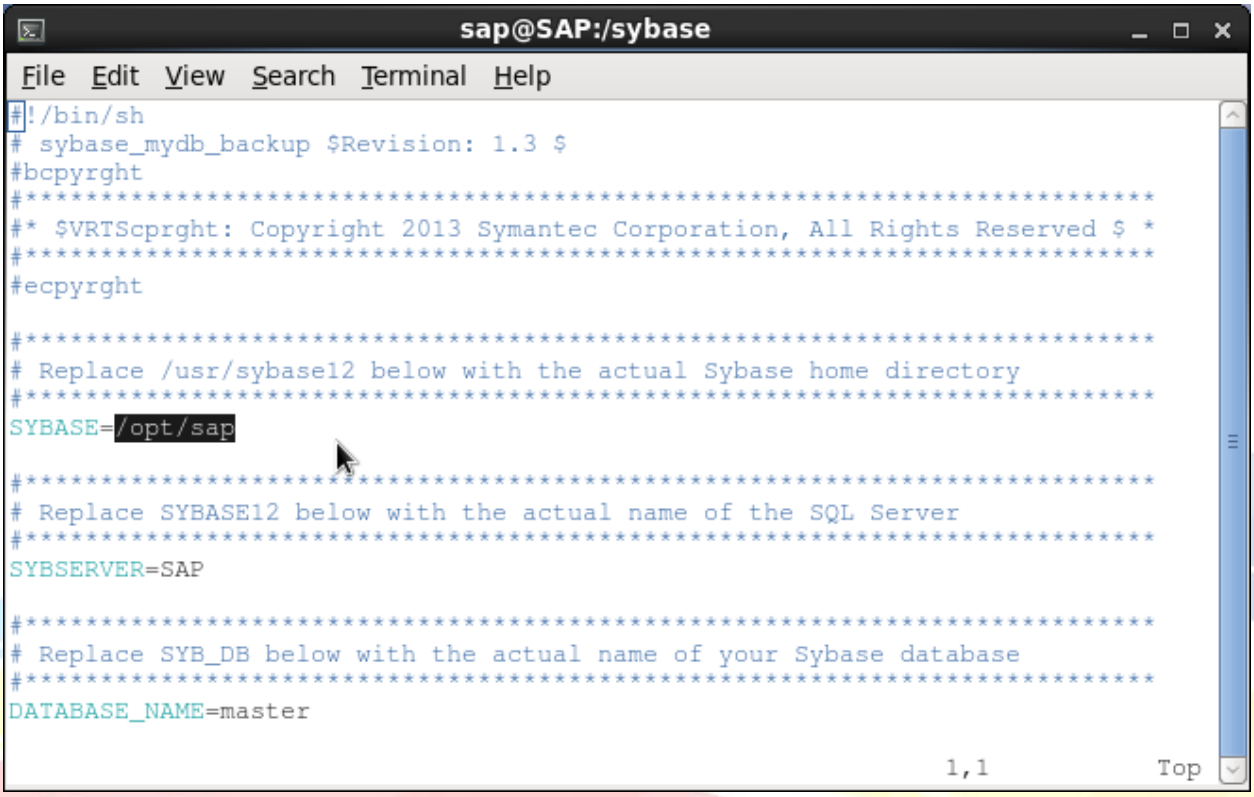
Use “vi “file name”” to edit any backup file

In this example I will be editing the backup script for master database

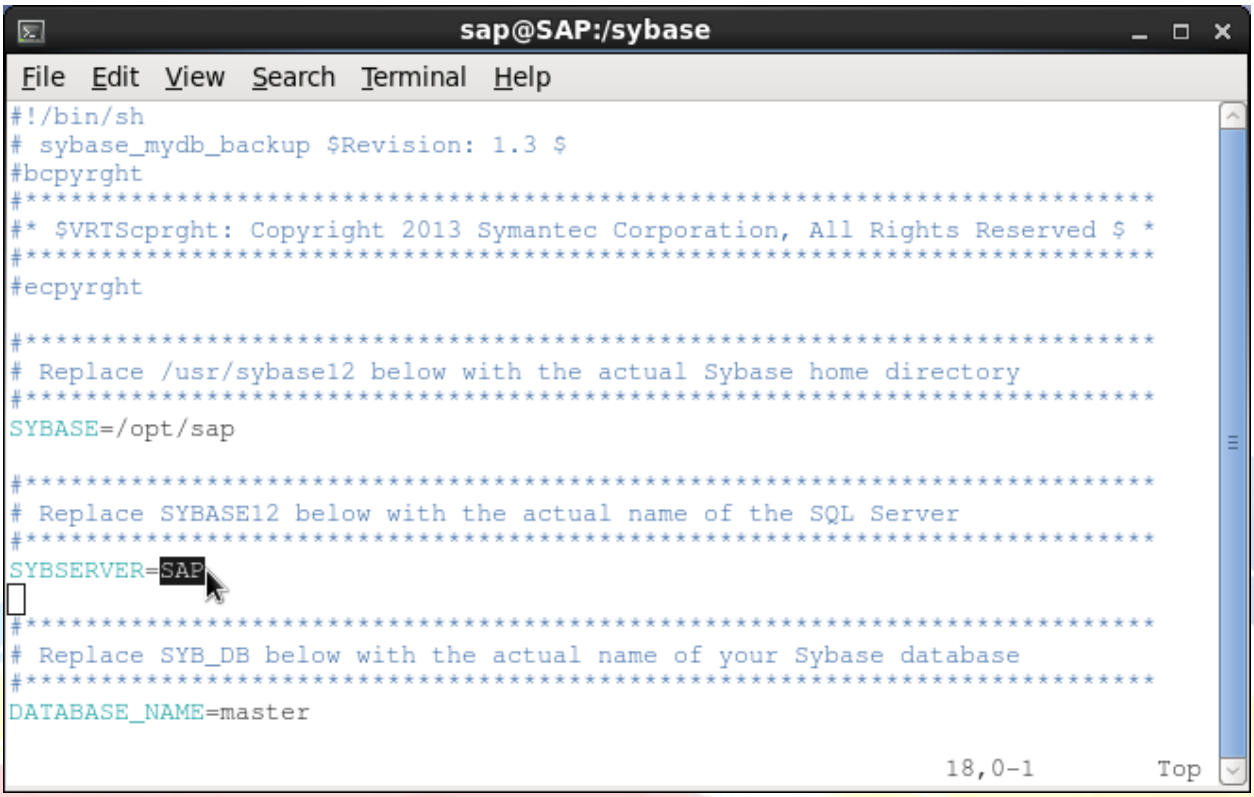
Using terminal the Netbackup administrator will change directory to the scripts directory running “cd /sybase” the edit the file using vi tool running “vi sybase_master_backup”



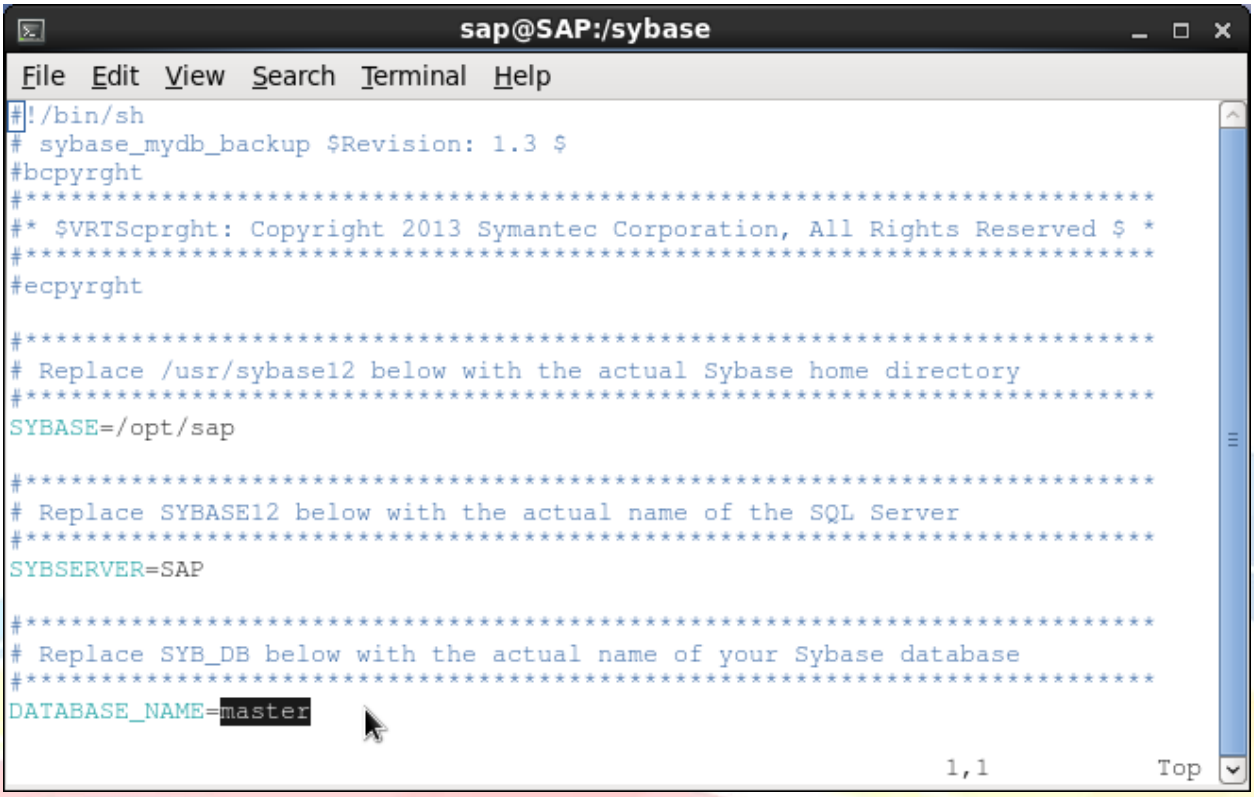
Then the backup administrator will edit the Sybase database instance home directory in the script using insert mode by clicking “i” and when done editing presses escape key.



Then the backup administrator will edit the Sybase database server name in the script using insert mode by clicking “i” and when done editing presses escape key.

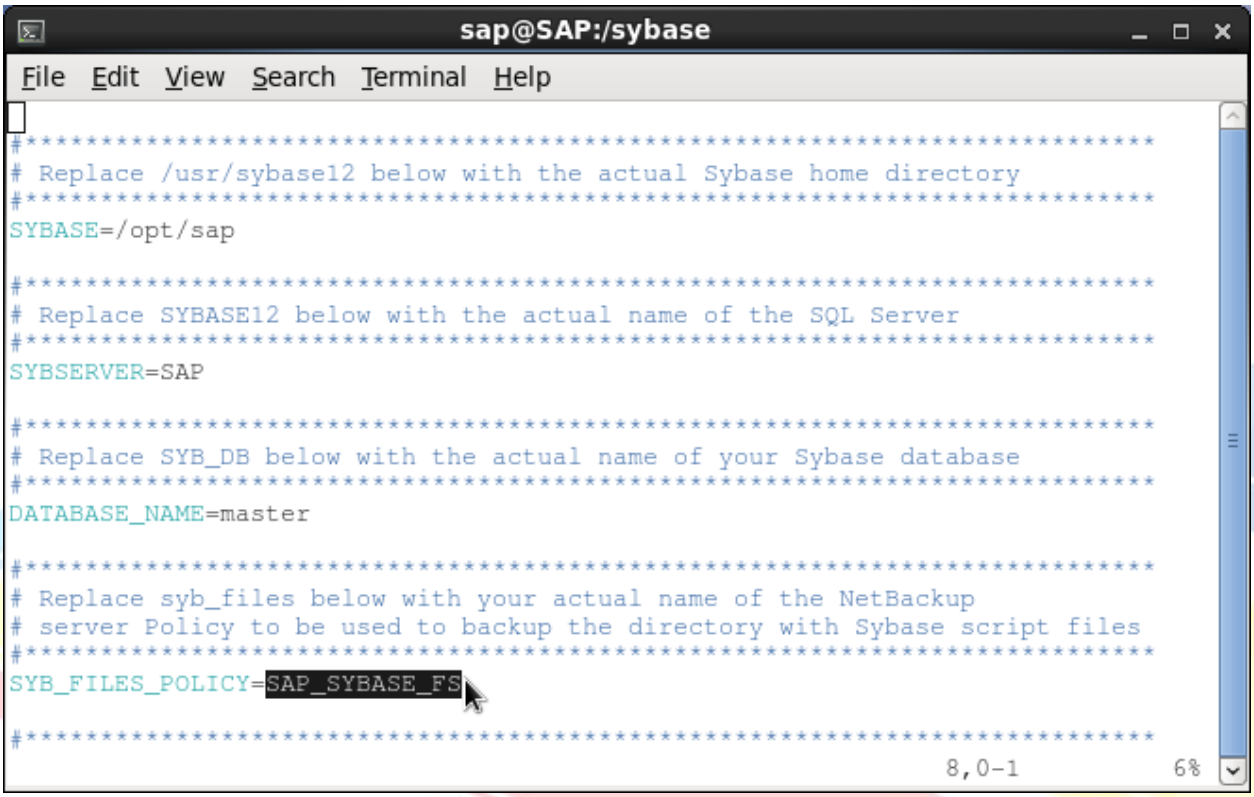


Then the backup administrator will edit the Sybase database name in the script using insert mode by clicking “i” and when done editing presses escape key.



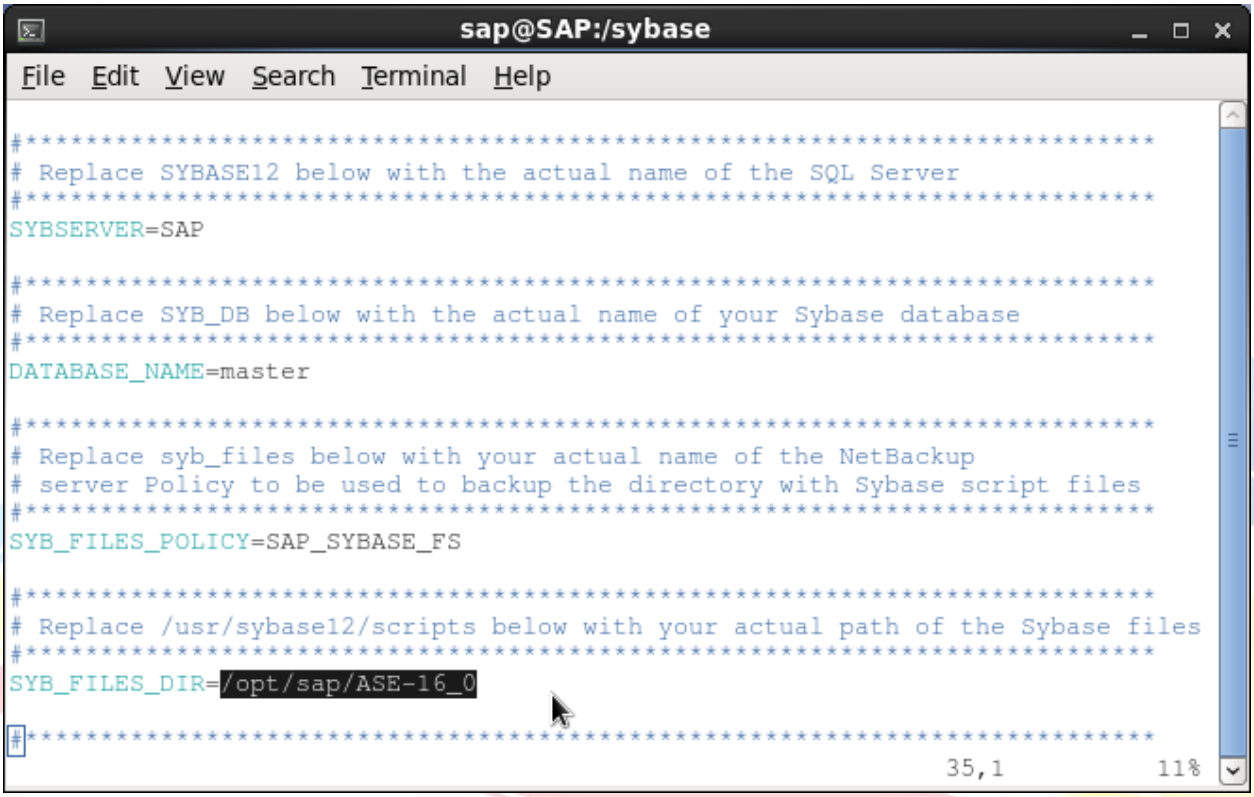
Then the backup administrator will edit the Sybase configuration files backup policy in the script using insert mode by clicking “i” and when done editing presses escape key.

The configuration files backup policy is a user backup policy used to backup the Sybase configuration files after a successful database full dump.



Then the backup administrator will edit the Sybase configuration files location in the script using insert mode by clicking “i” and when done editing presses escape key.

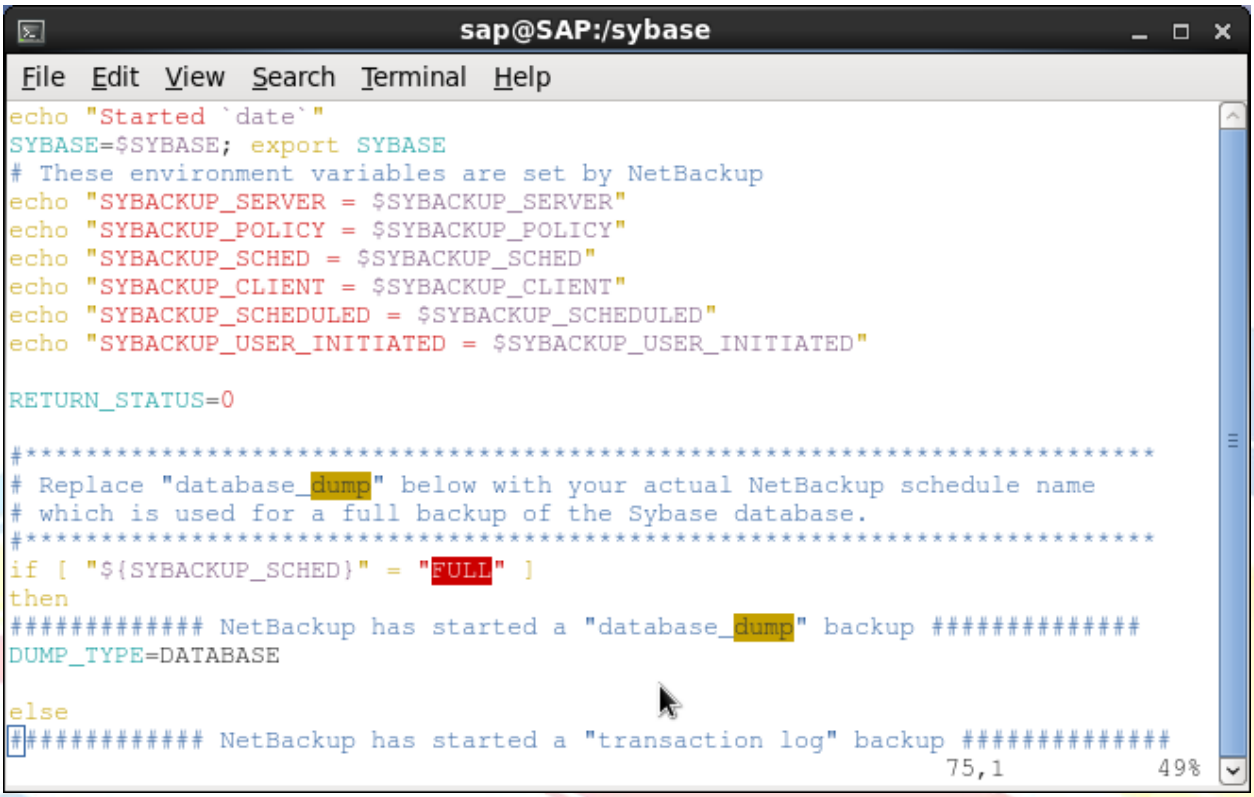
The configuration files location is where you find “(Server Name).cfg” file which in this case “/opt/sap/ASE-16_0” assuming that “/opt/sap” is the home directory.



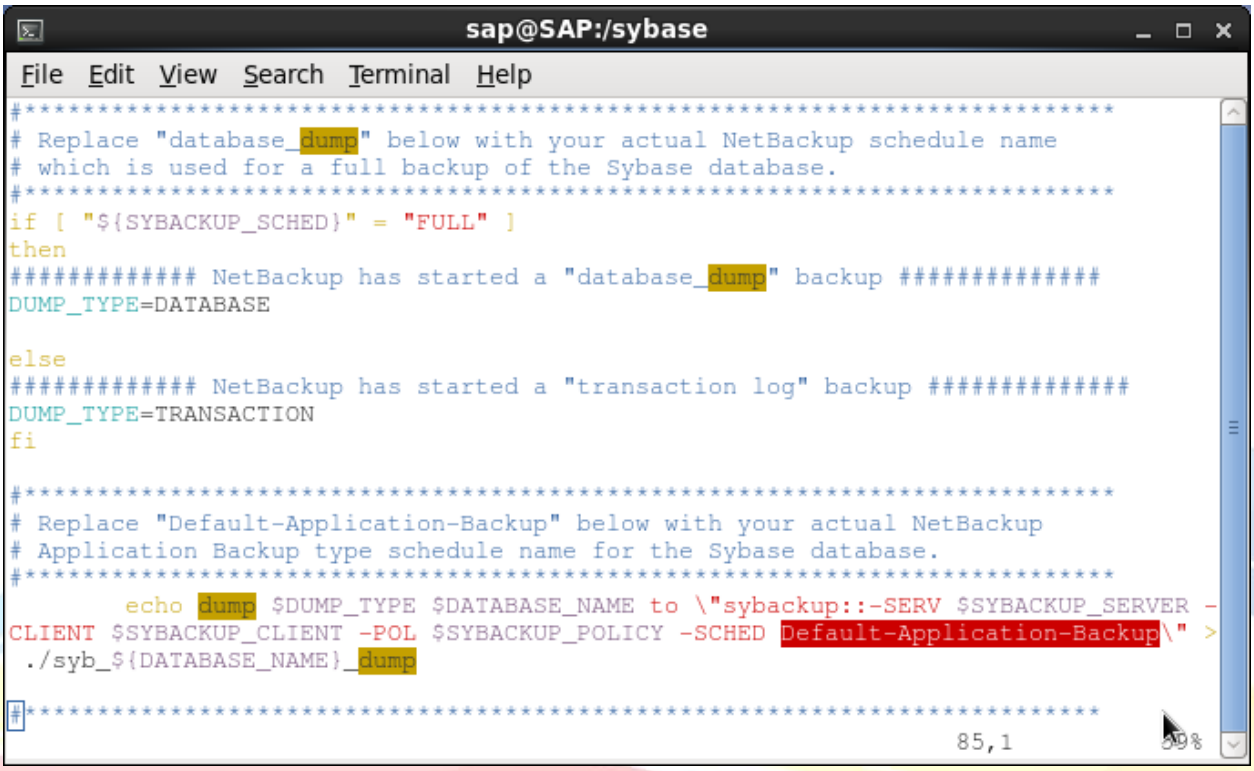
Then the backup administrator will edit the Sybase automatic database dump schedule name in the script using insert mode by clicking “i” and when done editing presses escape key.

In this case my Sybase automatic database dump schedule name was “FULL” marked in red.

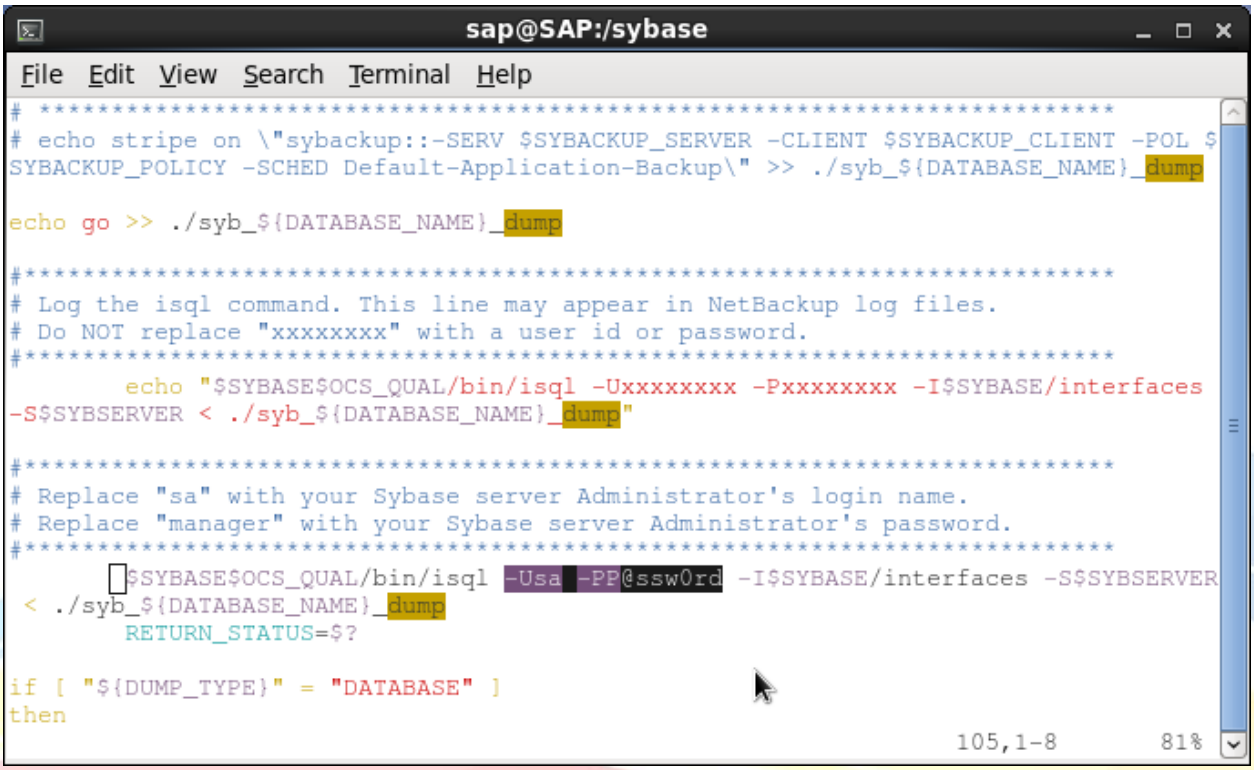
Note any other automatic schedule name will run a transaction log backup.



Then the backup administrator will edit the Sybase application backup schedule name in the script using insert mode by clicking “i” and when done editing presses escape key.



Then the backup administrator will edit the Sybase user name and password used for backup in the script using insert mode by clicking “i” and when done editing presses escape key.



Then the backup administrator will edit the Sybase stripe configuration in the script using insert mode by clicking “i” and when done editing presses escape key.

➔ Remove the hash preceding the this line

echo stripe on \"sybackup::-SERV $SYBACKUP_SERVER -CLIENT $SYBACKUP_CLIENT -POL $SYBACKUP_POLICY -SCHED Default-Application-Backup\" >> ./syb_${DATABASE_NAME}_dump

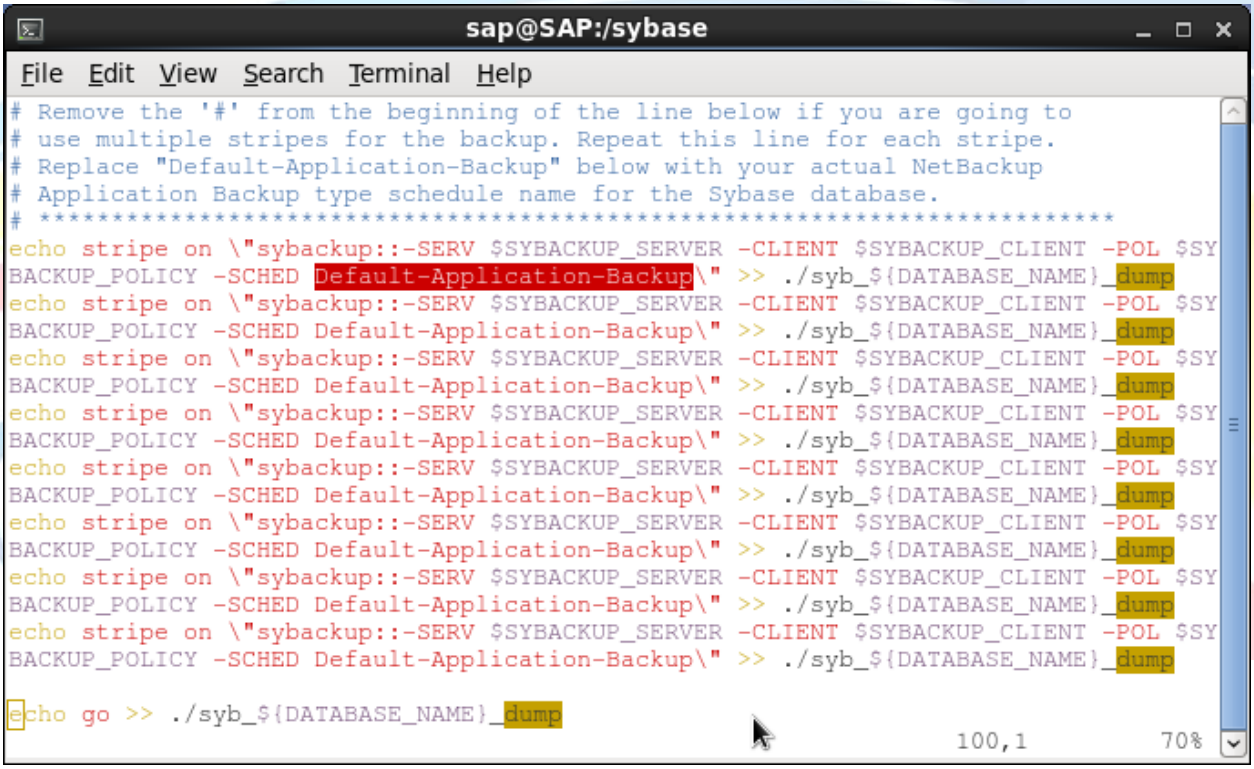
➔ Replace "Default-Application-Backup" with the Application Backup Schedule name used for database backup

➔ Copy the line as many times as the No. of Streams you want to use

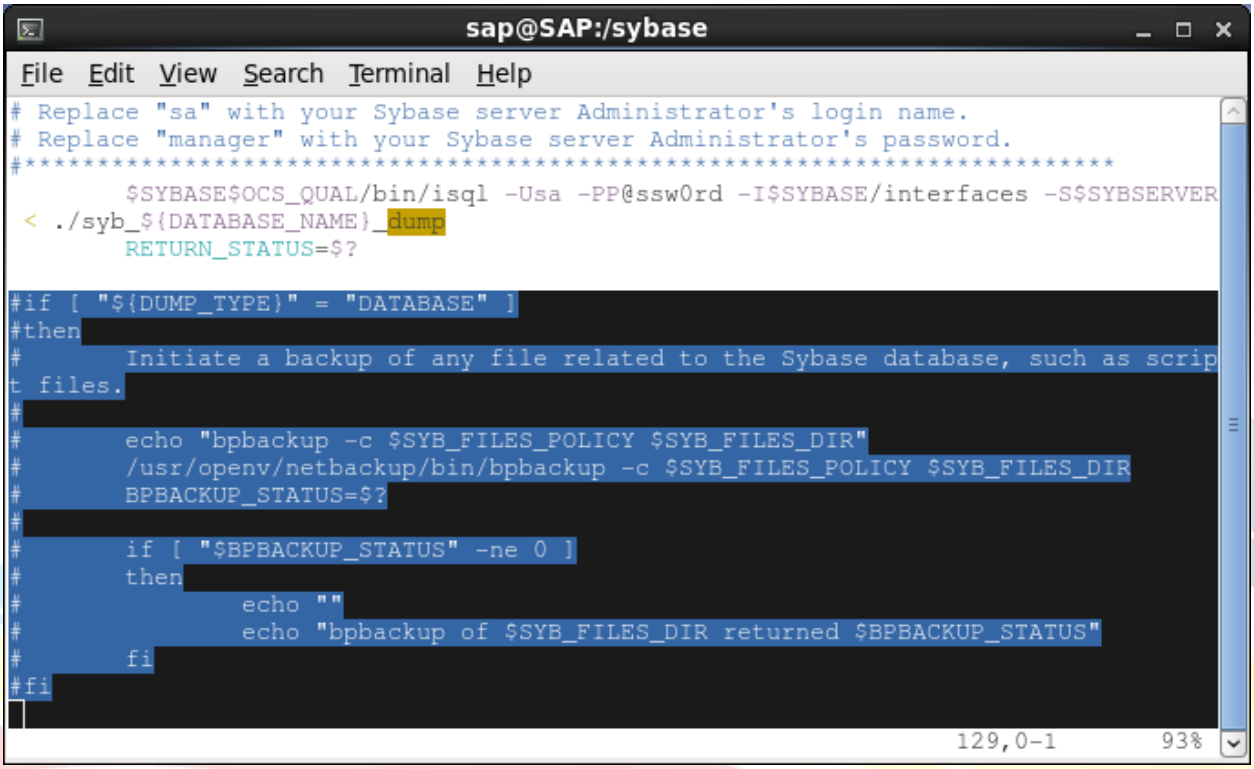
Notes

Do not use too many streams it may affect the performance of SAP Server (use 8 Streams for Example).

You will have to use the same No. of streams on restore.



The marked if statement below is for the backup of Sybase configuration file after a successful database dump, just hash it as below in every database backup script except for the master database, as you do not want to backup the same configuration files as many times as the number of databases you have.



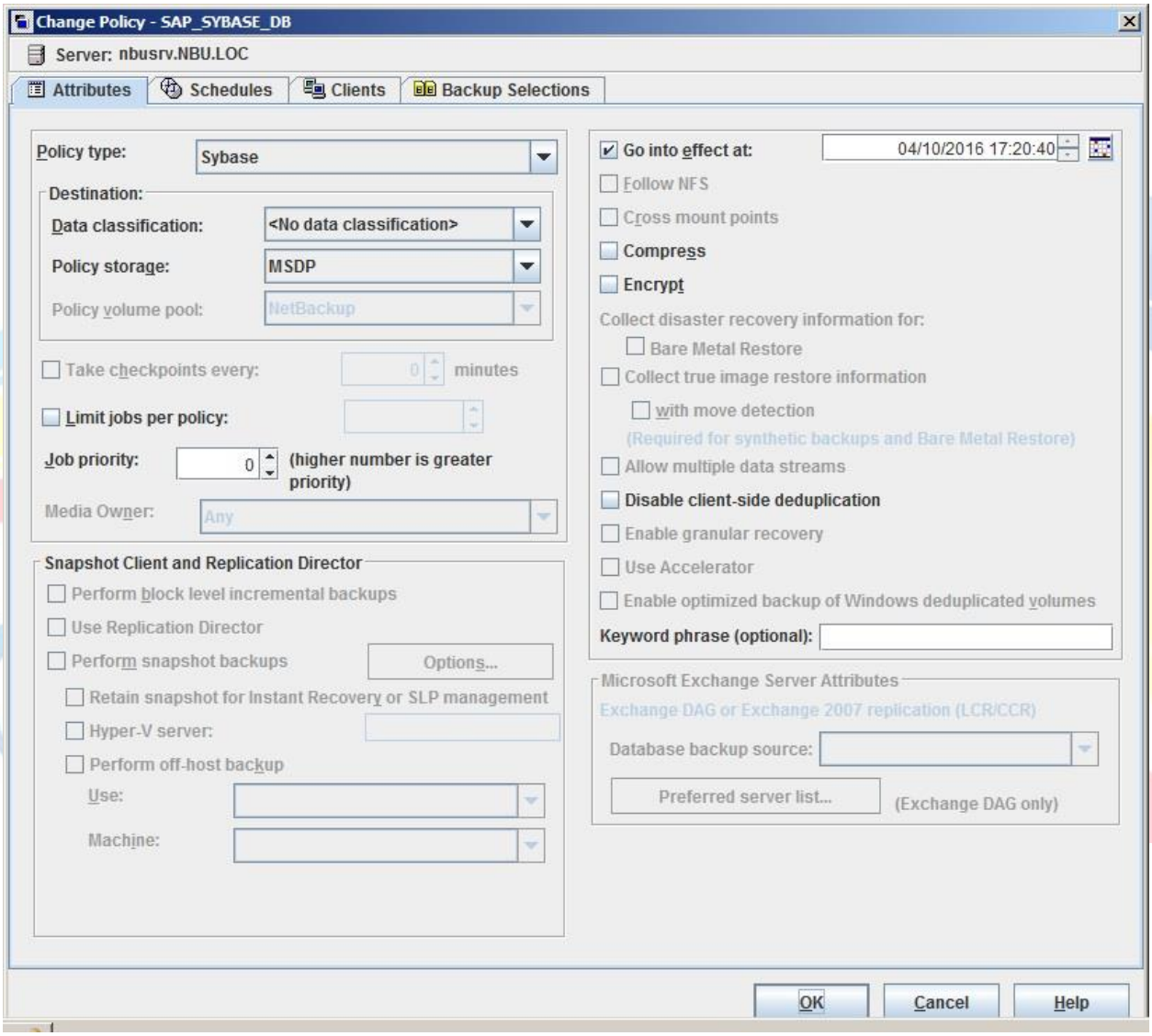
After the editing is done you will press escape key to exit insert mode then input ":wq" and press enter to write changes and exit vi editing tool.

Creating Backup Policies

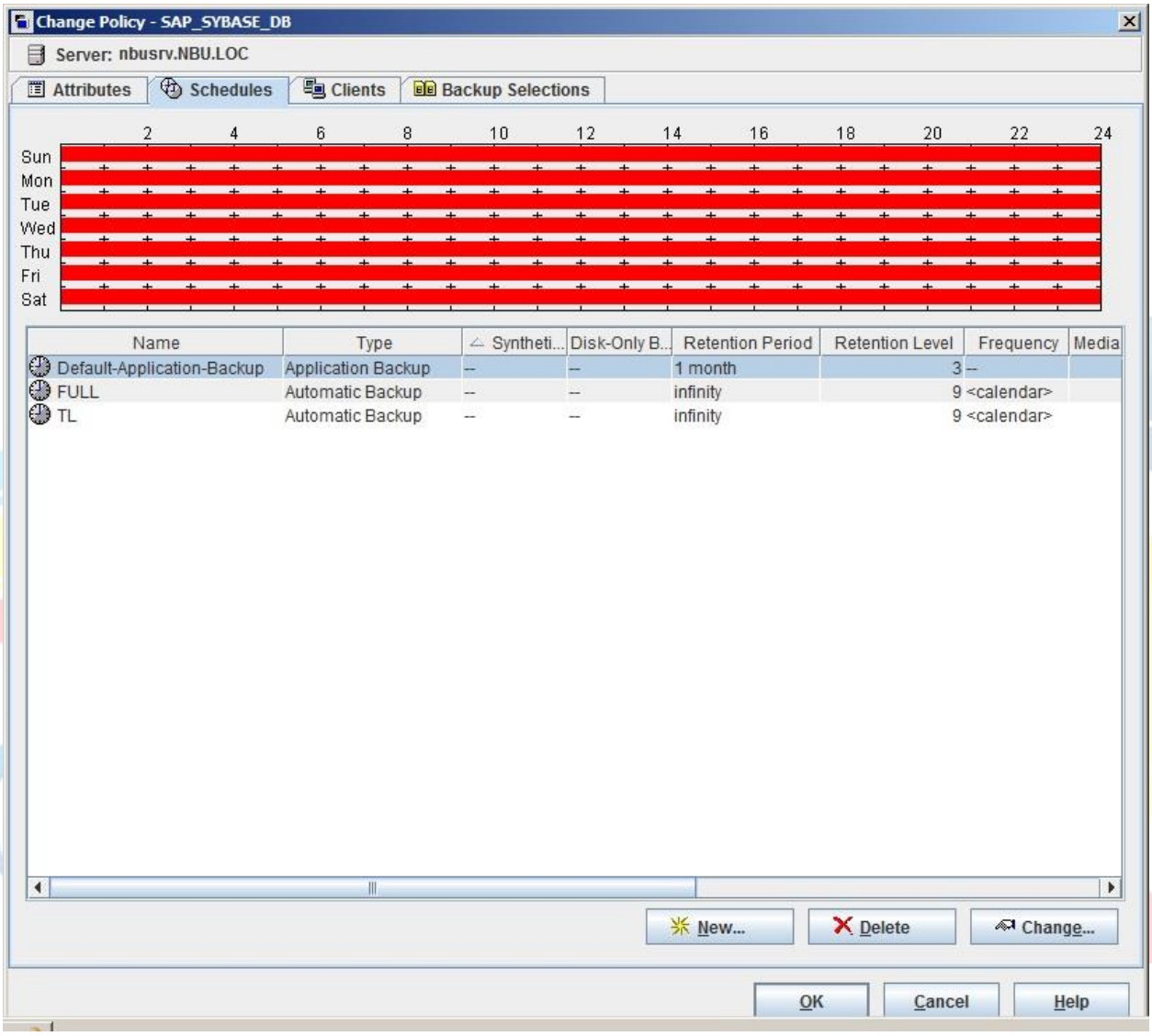
Here comes the part that a lot of administrators love the GUI, the Netbackup administrator will create two policies, and that is the unique part about Sybase database backup, the first Policy is for the databases that will be backed up, and the second policy is for the configuration files backup.

Database Backup Policy

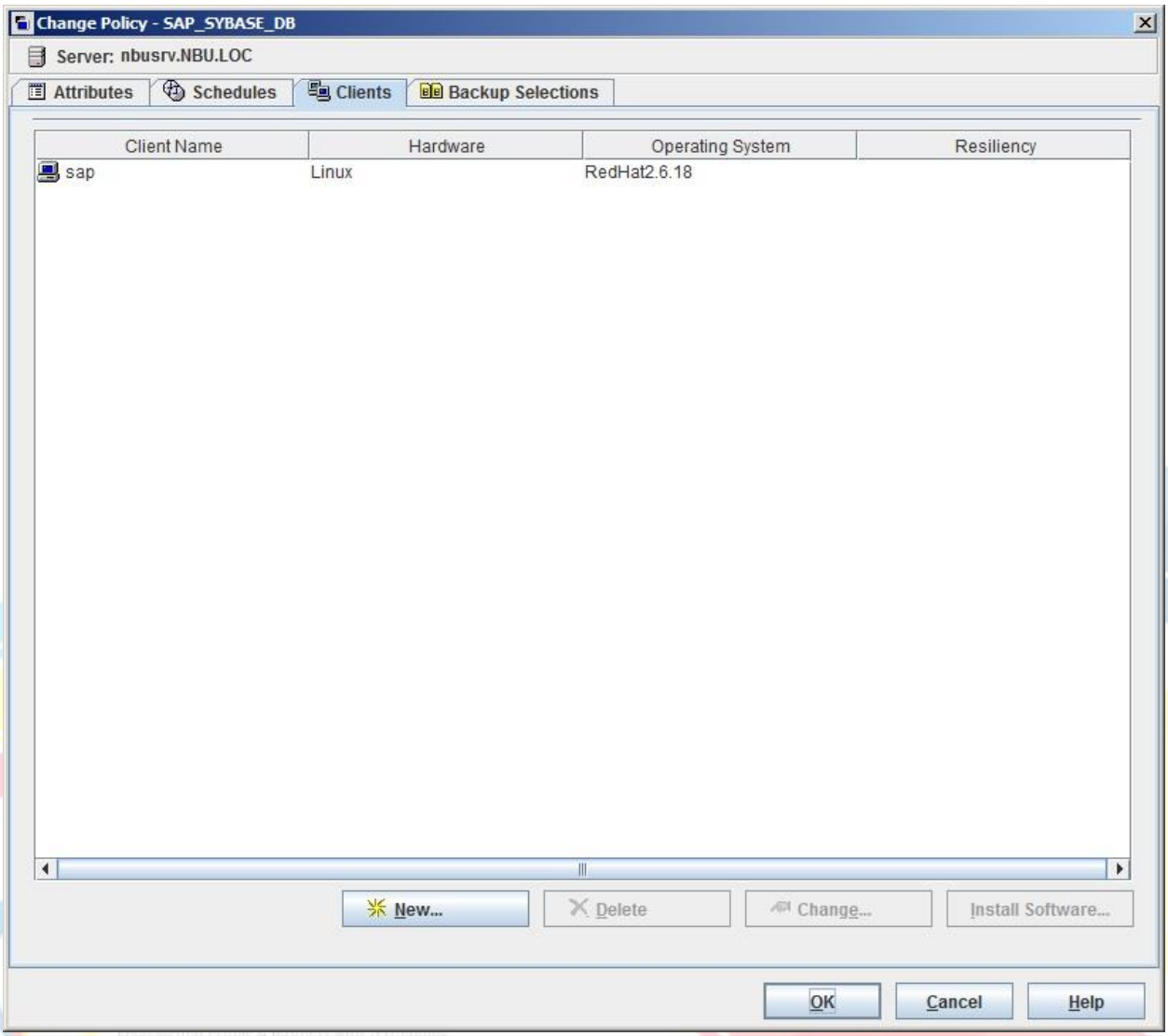
A normal policy with the policy type set to “Sybase”



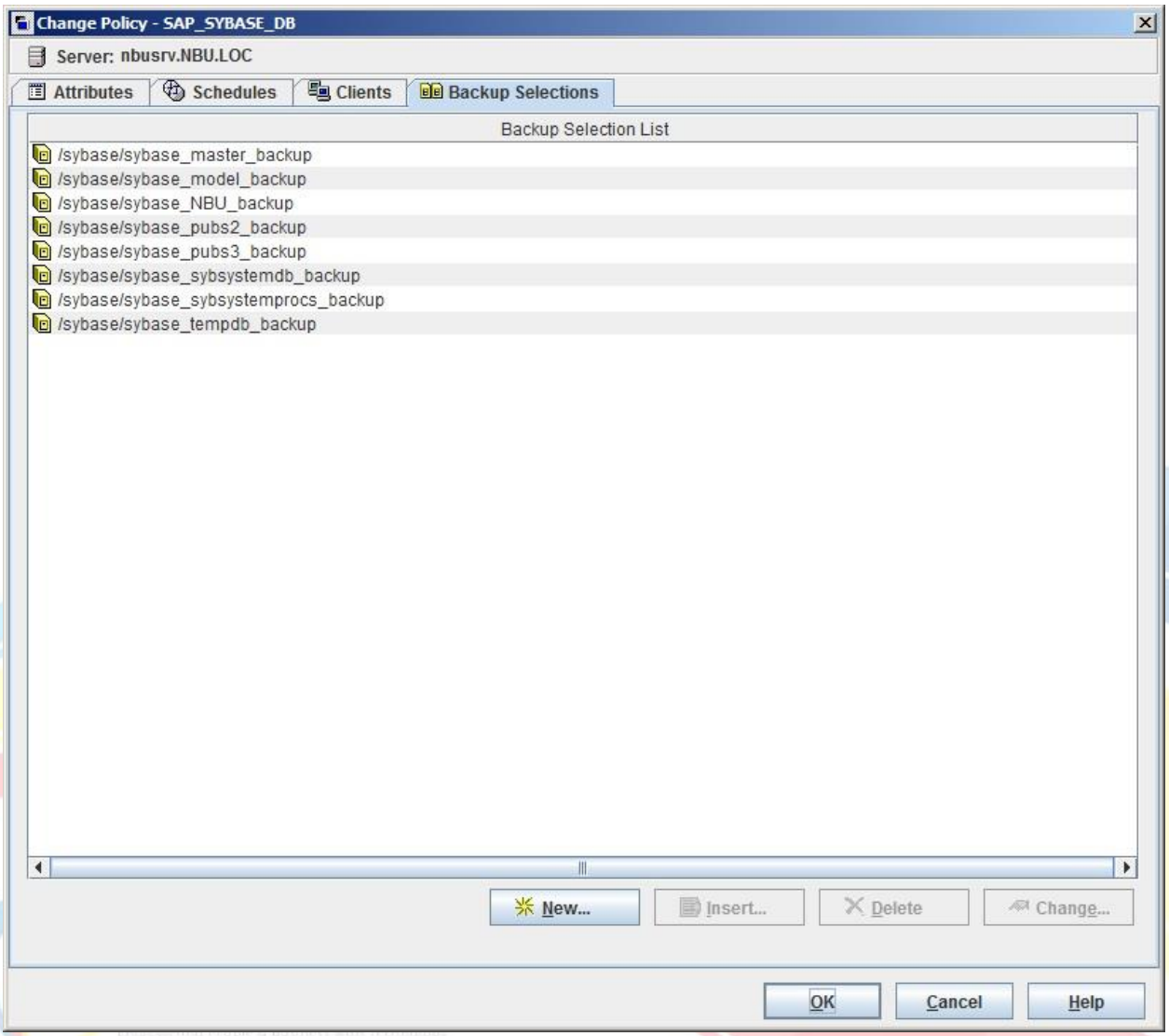
With three schedules, the first is “Application Backup” schedule created by default named “Default-Application-Backup” and the retention in this backup is the applied retention, the second is “Automatic Backup” schedule named “FULL” as in the backup script and it is for database dump, the third is also “Automatic Backup” schedule named “TL” or any other name except for “FULL” that we used in the backup script and it is for transaction log dump.



With the Sybase server name as client in the client selection.

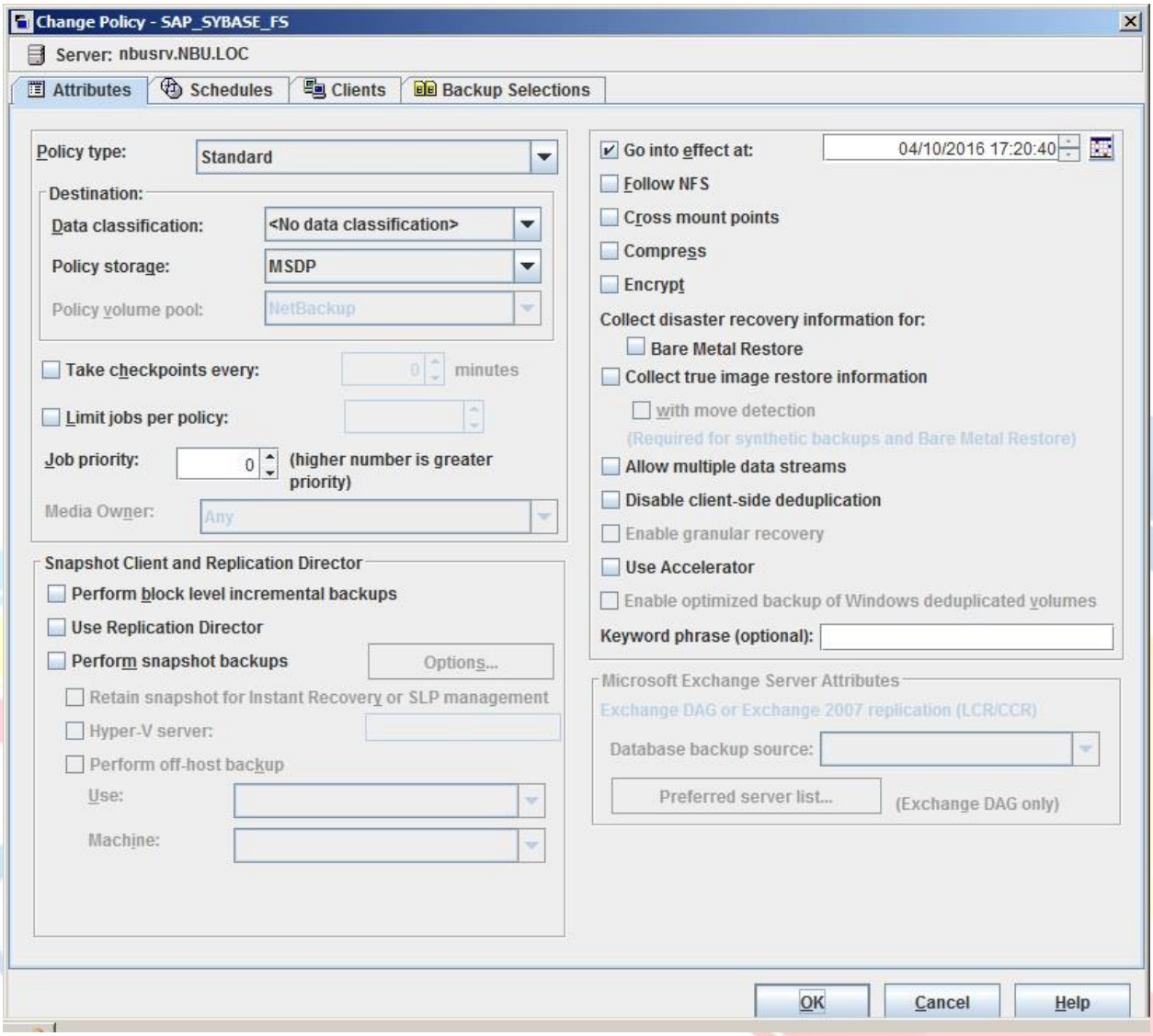


With the backup scripts you created as backup selection.



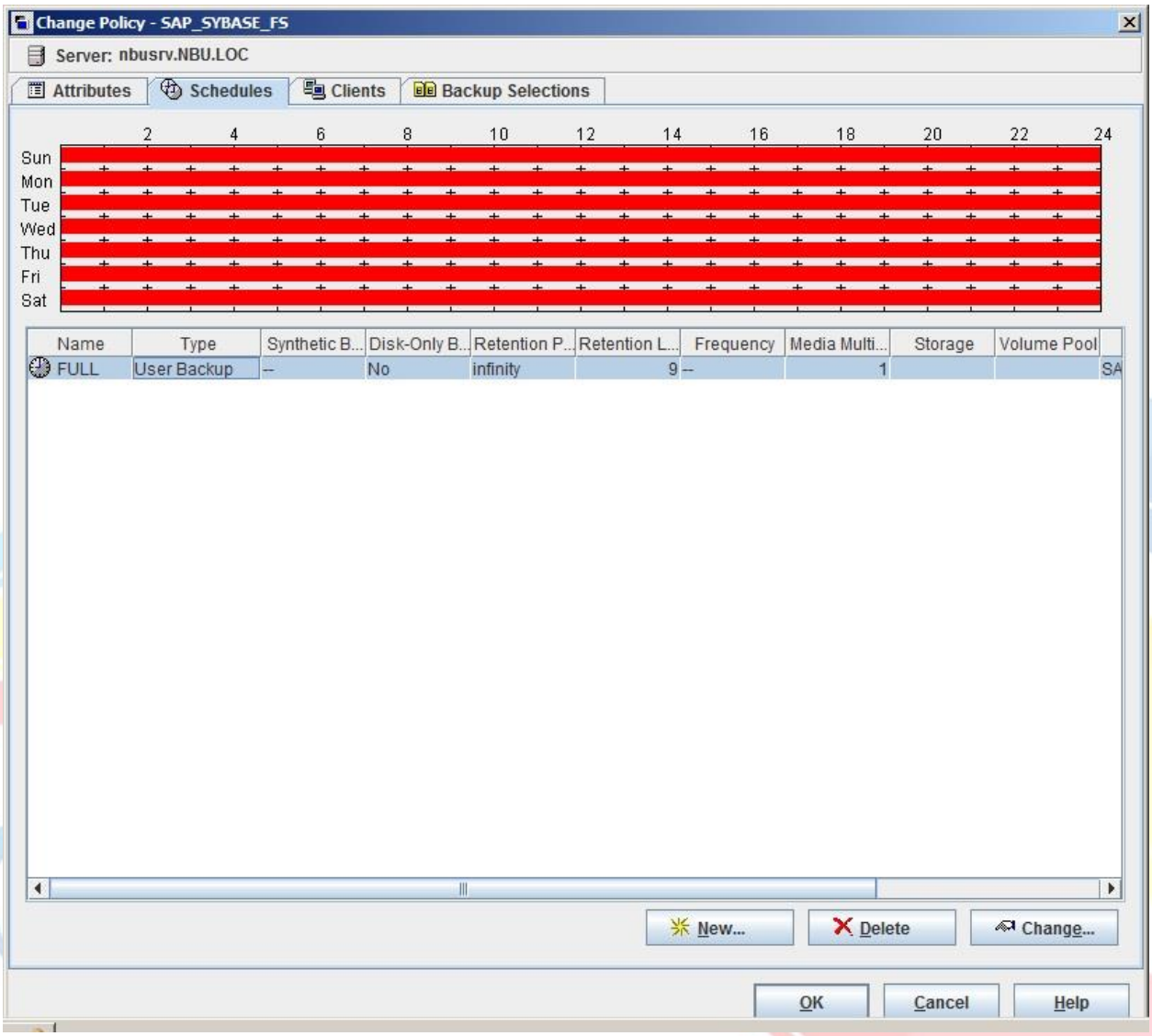
Configuration files Backup Policy

A normal policy with the policy type set to “standard”

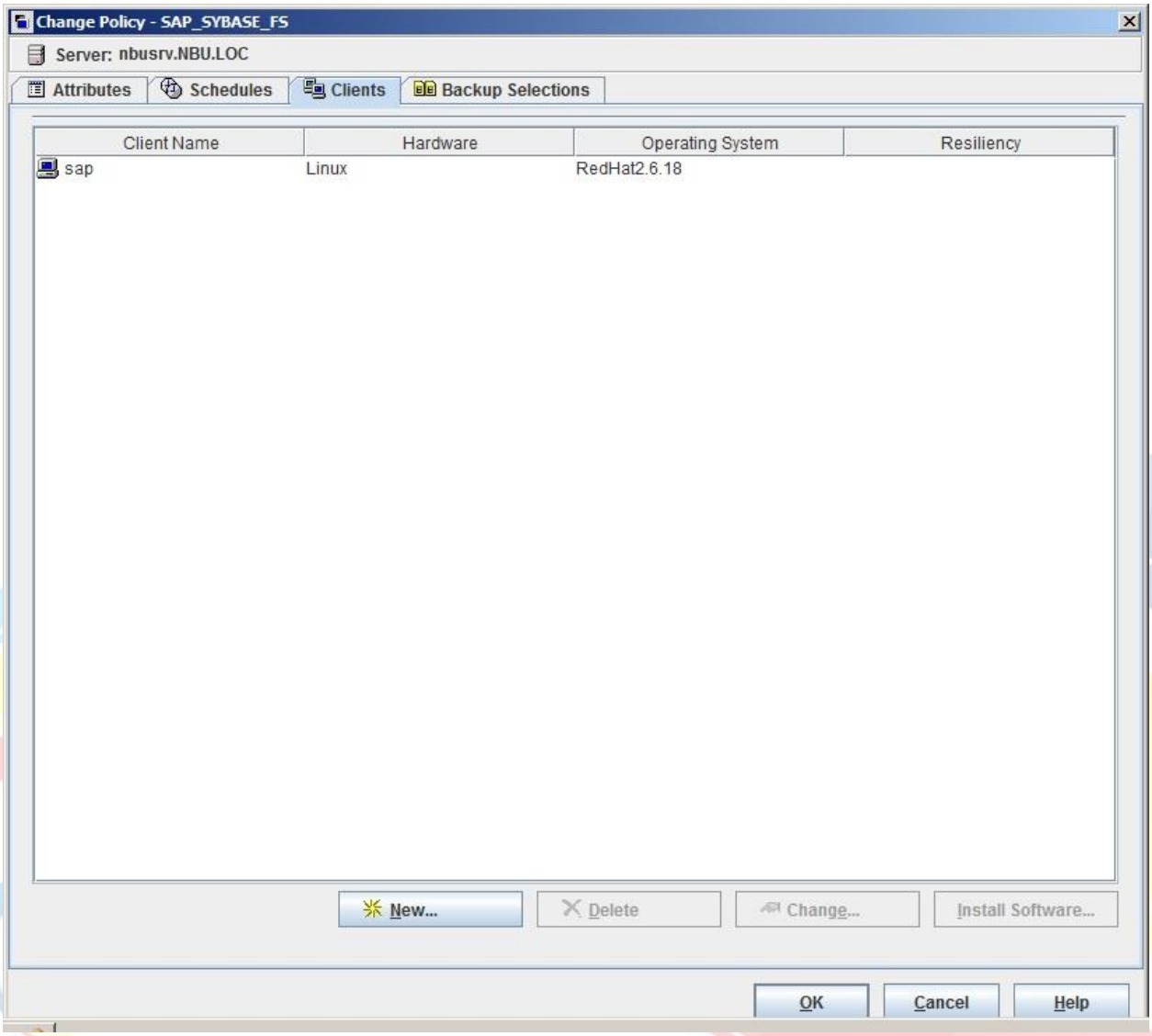


With a “User Backup” schedule named “Full” or any name you want.

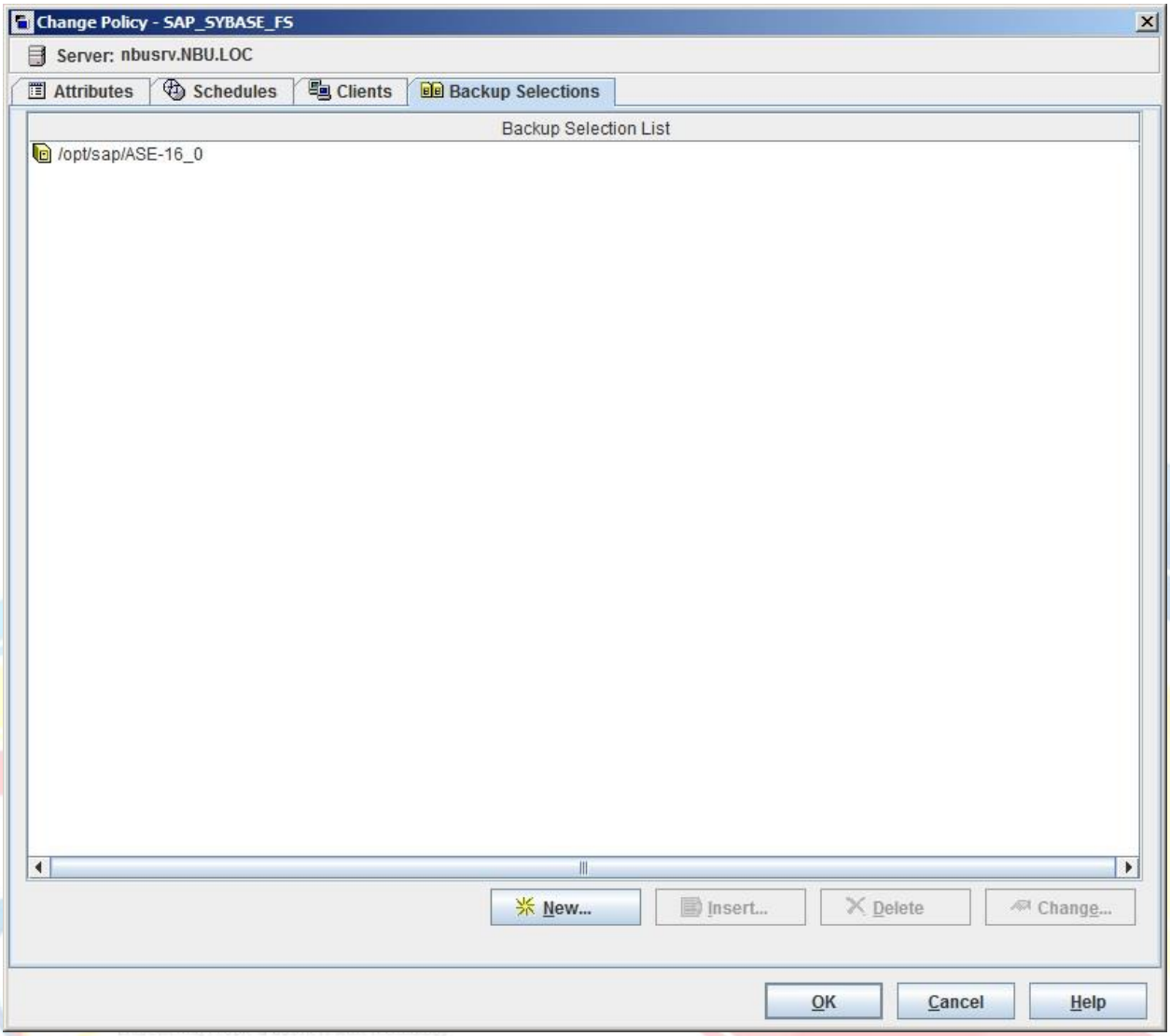
Note this schedule is called by the backup script after a successful database dump only.



With the Sybase server name as client in the client selection.



With “/opt/sap/ASE-16_0” as the backup selection assuming that “/opt/sap” is the Sybase home.



Restore Sybase Database

Here comes the important part where some administrators may panic, we have a corrupted database, or he deleted the database not me situation.

But no worries, the restore is not that hard you will just have to be prepared.

First list available backups and prepare a template restore and load scripts and learn how to use them.

Second In situation of database does not exist, create a new empty one with the proper size.

Third start your restore and monitor its progress.

Listing Backups and Creating Scripts

At this part you will list the available backups, edit the restore script, and edit the load script.

After this step you will be ready to execute the restore, but if you do not have a database to restore to you will have to create a new one for the restore process.

Listing available backups

This part is not hard you will just have to use bplist to list your available backups.

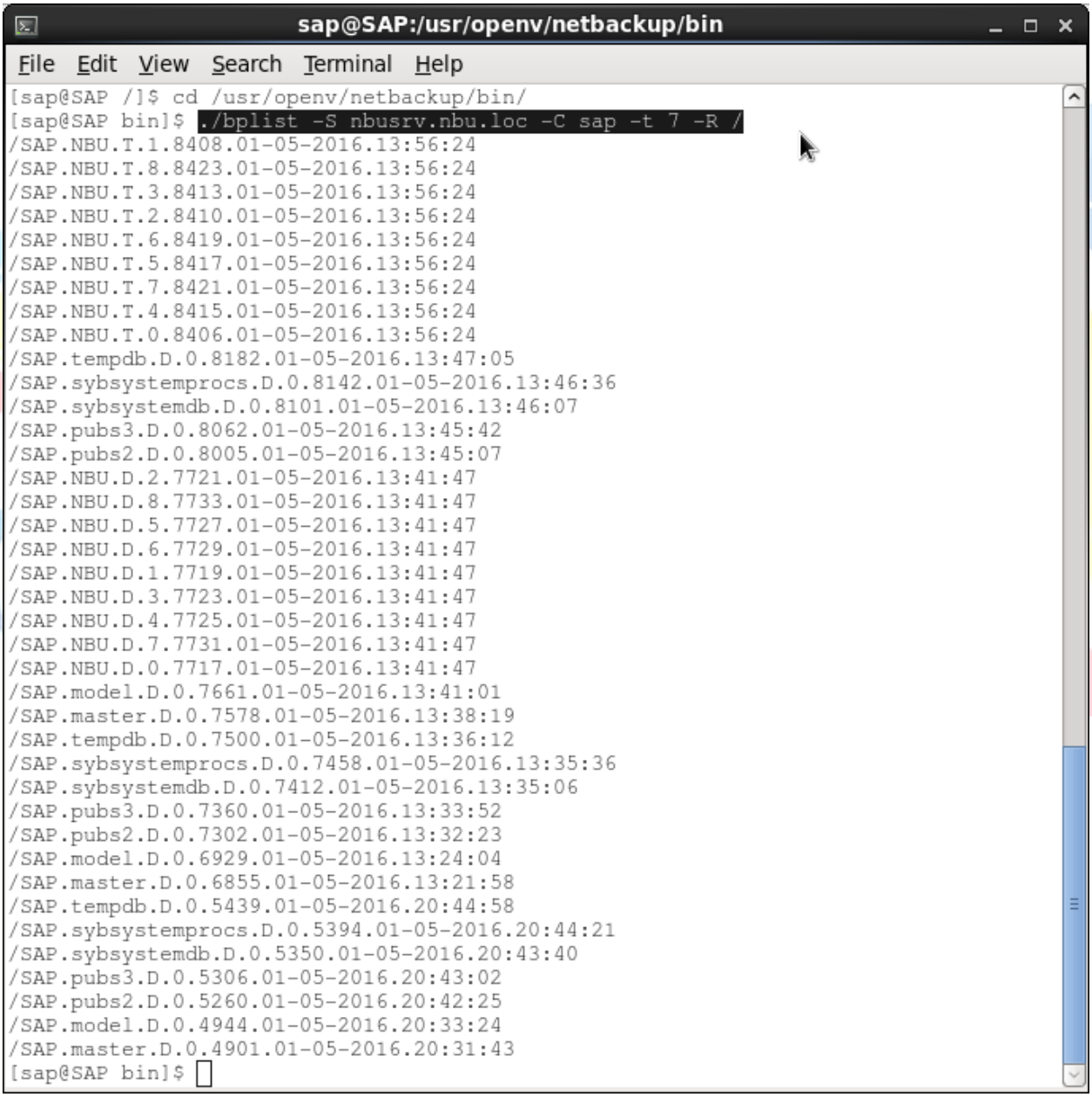
Using terminal the Sybase database administrator will change directory to “/usr/openv/netbackup/bin”, then executes “./bplist –S nbusrv.nbu.loc –C sap –t 7 –R /”, this will list all the available Sybase database backups, Below is explanation for the command and the output

bplist –S nbusrv.nbu.loc -C SAP -t 7 -R /

"Backup Server Name" "Sybase Backed up Server Name" "Policy Type Sybase (7)"

/ SAP . NBU . T . 3 . 11011 . 15-04-2016.14:17:29

/"Server Name" . "Database Name" . "Data Dump (D) or Transaction Dump (T) . "Strip No. " . "Backup ID" . "Backup Date &Time"

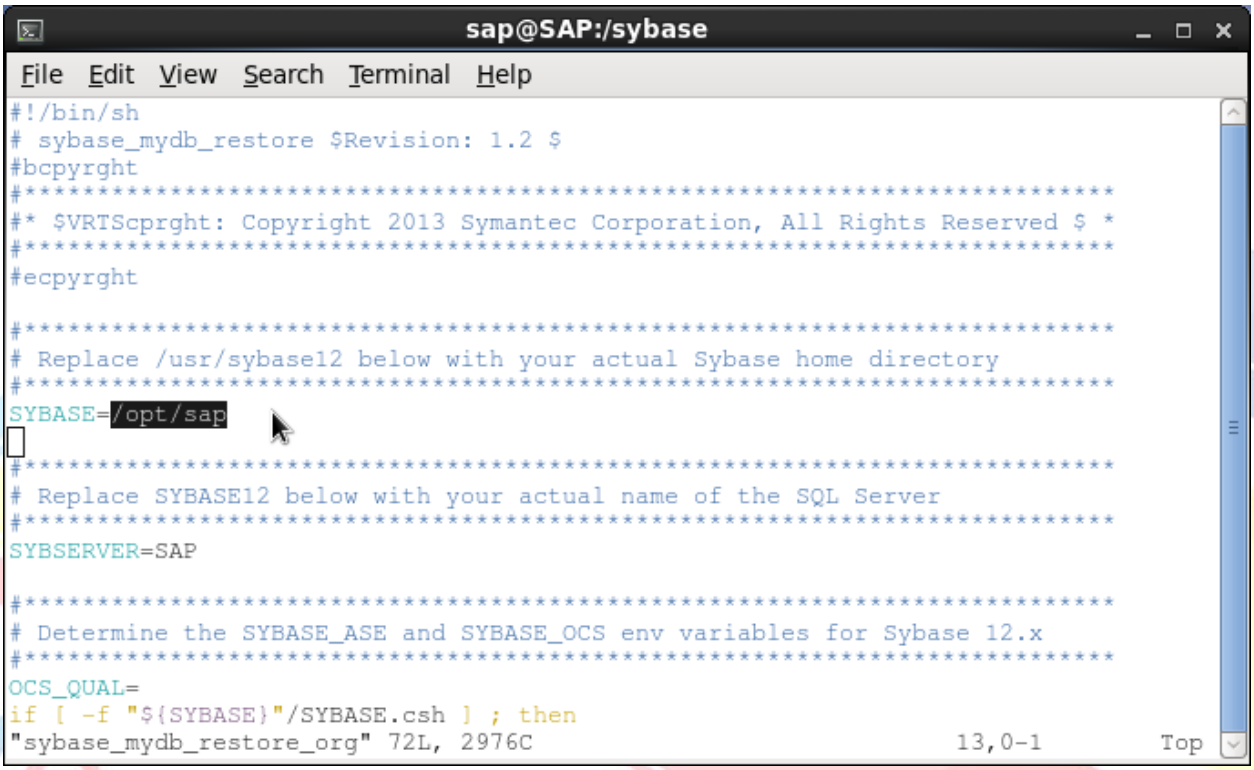


Editing the restore script

The Sybase database administrator will create the restore script by editing the script copied before.

Using terminal the Sybase database administrator will change directory to “/sybase” running “cd /sybase” then edit the restore script using vi editing tool running “vi sybase_mydb_restore”.

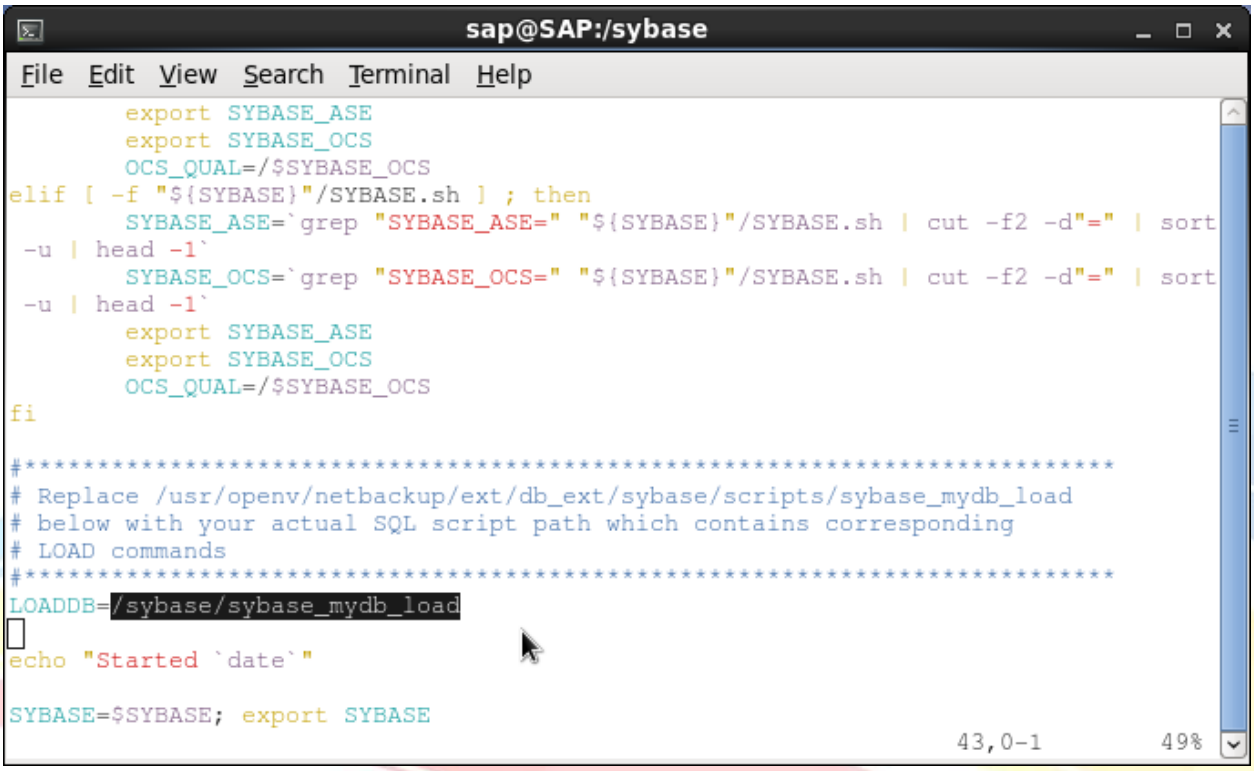
In the vi editing tool he will use the insert mode by pressing “i” key to edit the sybase home directory then pressing escape key to exit the editing mode.



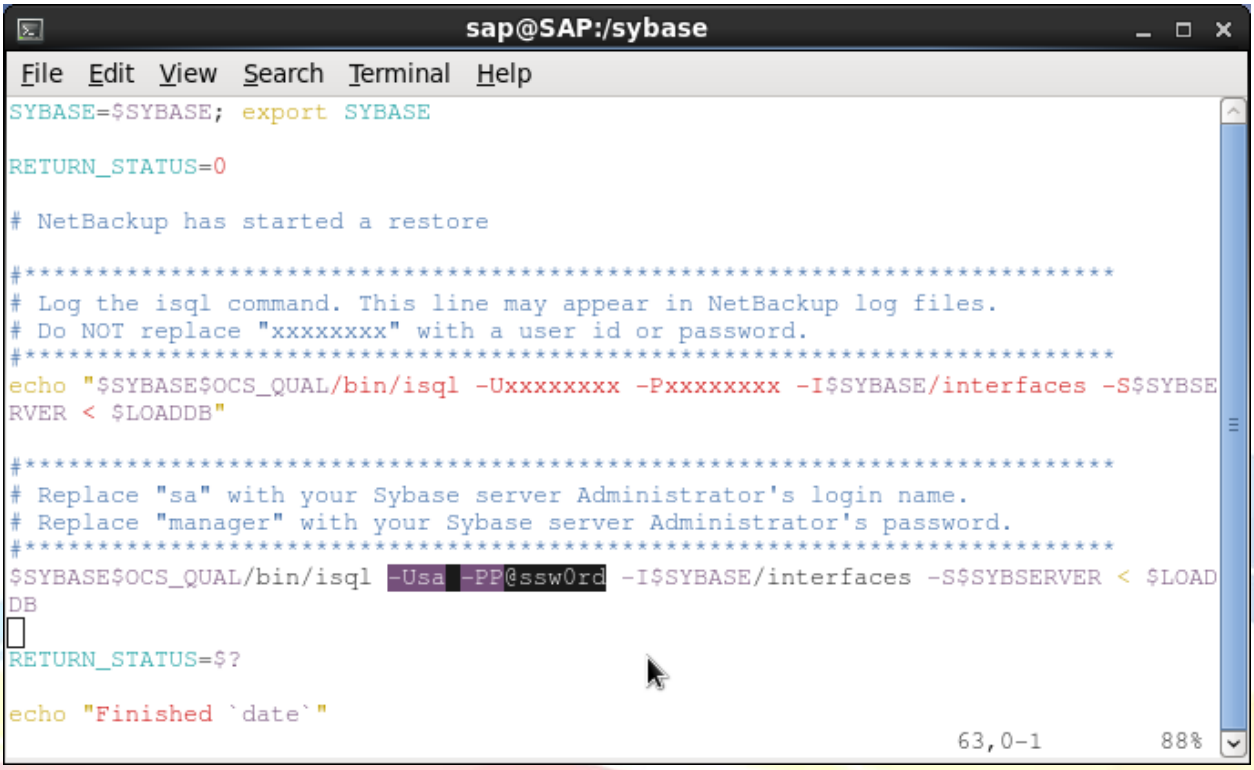
The Sybase database administrator will use the insert mode by pressing “i” key to edit the Sybase Server name then pressing escape key to exit the editing mode.

The Sybase database administrator will use the insert mode by pressing “i” key to edit the loaddb script location then pressing escape key to exit the editing mode.

Note that the load database is already copied to “/sybase” in a previous step.



The Sybase database administrator will use the insert mode by pressing “i” key to edit the user name and password used for restore then pressing escape key to exit the editing mode.



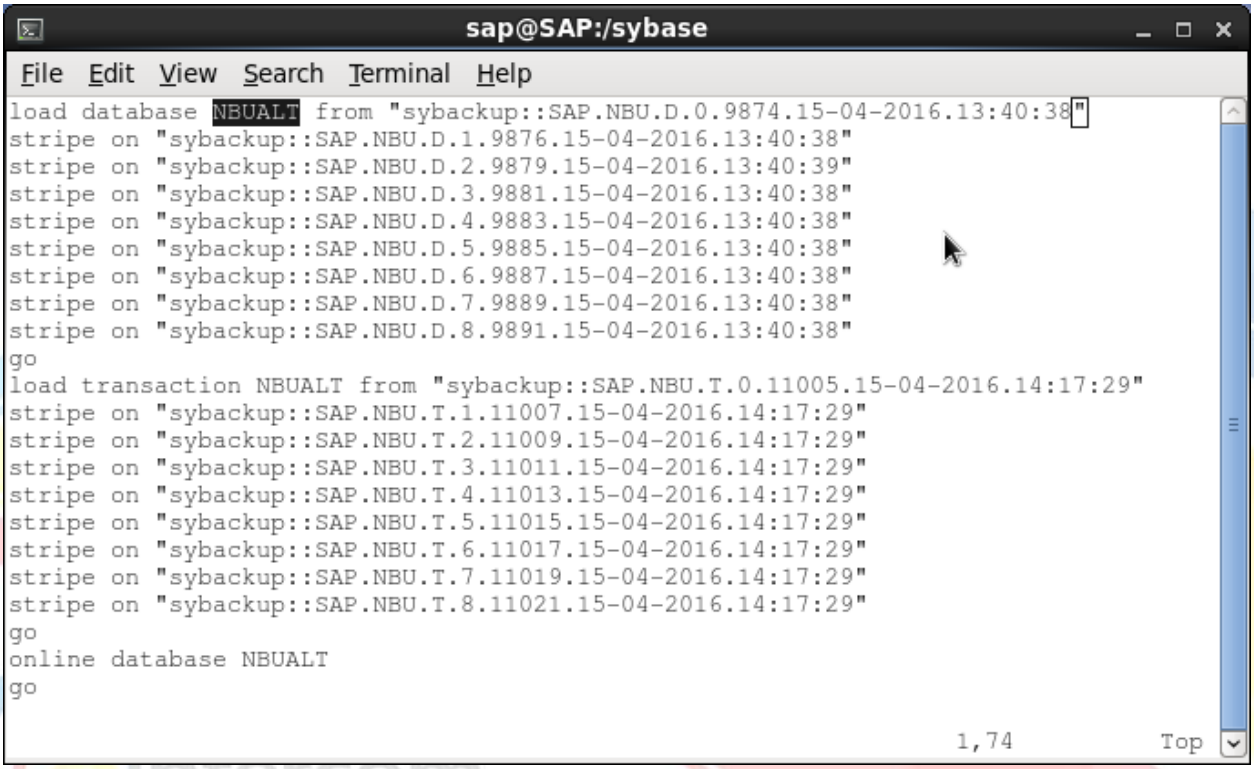
After the editing is done you will press escape key to exit insert mode then input “:wq” and press enter to write changes and exit vi editing tool.

Editing the load script

After listing the available backups the Sybase database administrator would have chosen the proper backup IDs for restore, and at this step he will insert them into the load script to be loaded.

Using terminal the Sybase database administrator will change directory to “/sybase” running “cd /sybase” then edit the load script using vi editing tool running “vi sybase_mydb_load”.

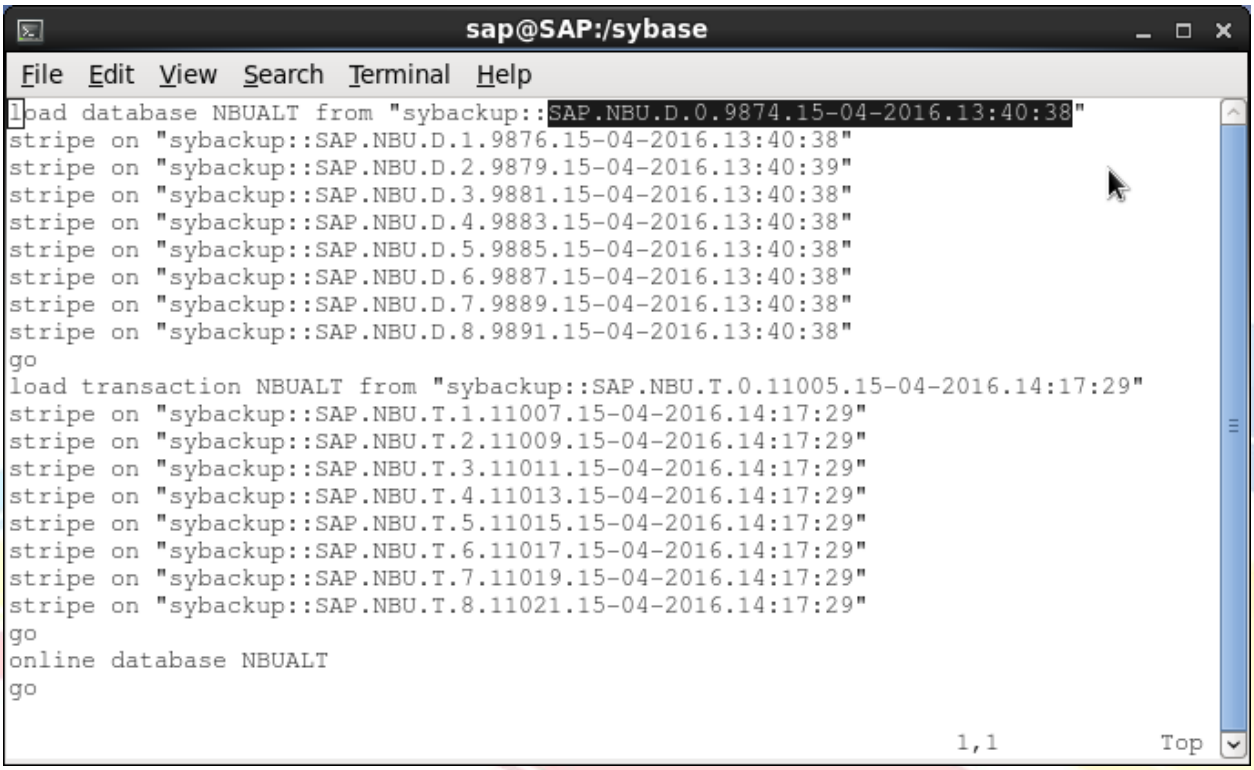
In the vi editing tool he will use the insert mode by pressing “i” key to edit the destination database for full database dump restore then pressing escape key to exit the editing mode.



In the vi editing tool he will use the insert mode by pressing “i” key to edit the database dump backup ID for restore then pressing escape key to exit the editing mode.

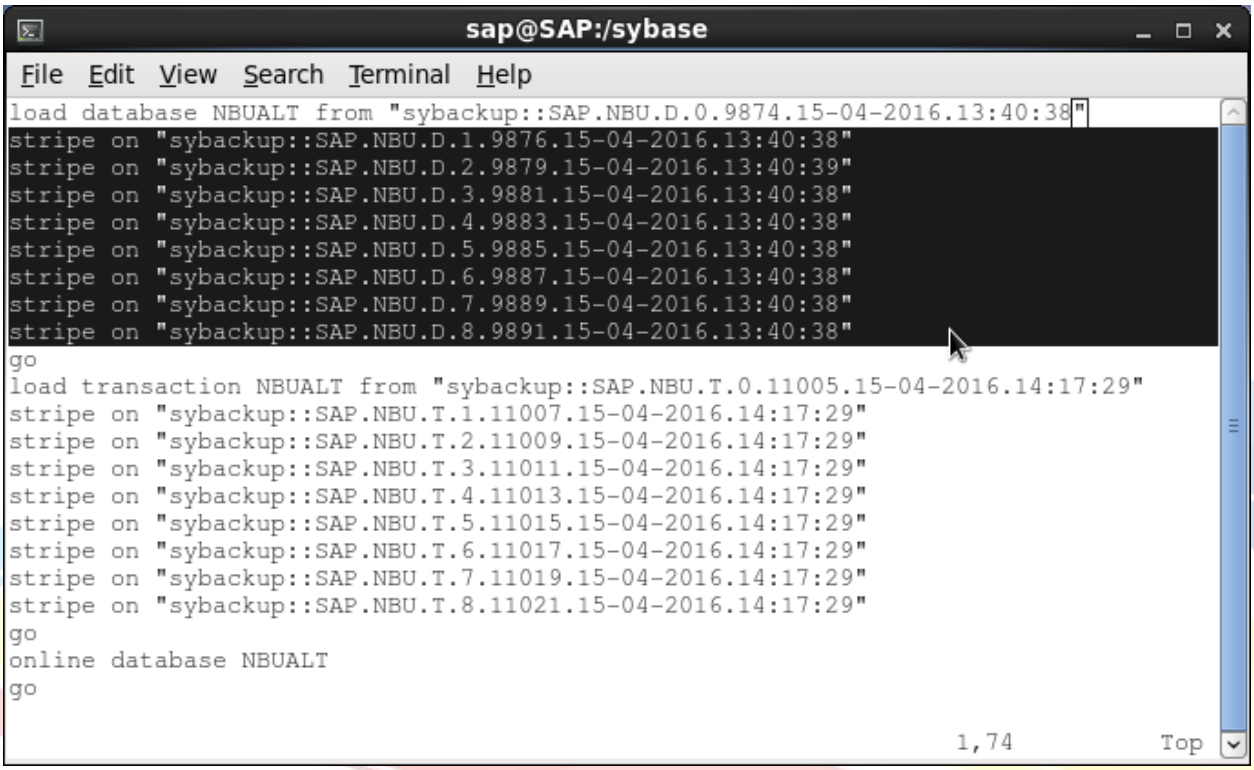
Note in case you did not use stripes in backup you will only need that line without the “stripe on” lines.

The database dump will always have stripe ID “0”.

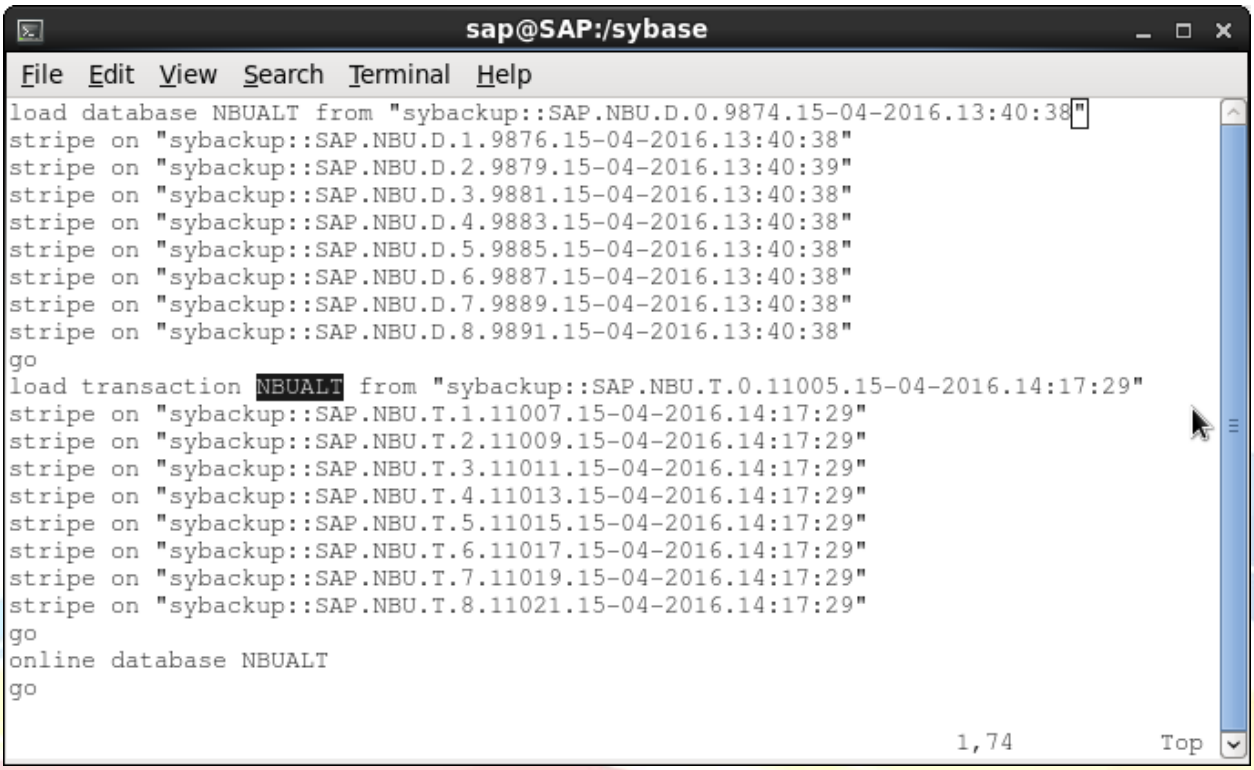


In the vi editing tool he will use the insert mode by pressing “i” key to edit the Stripe on lines according to the backup set available then pressing escape key to exit the editing mode.

Note in this case backup stripes are 8 starting 1 to 8 with the database dump backup ID stripe number 0.



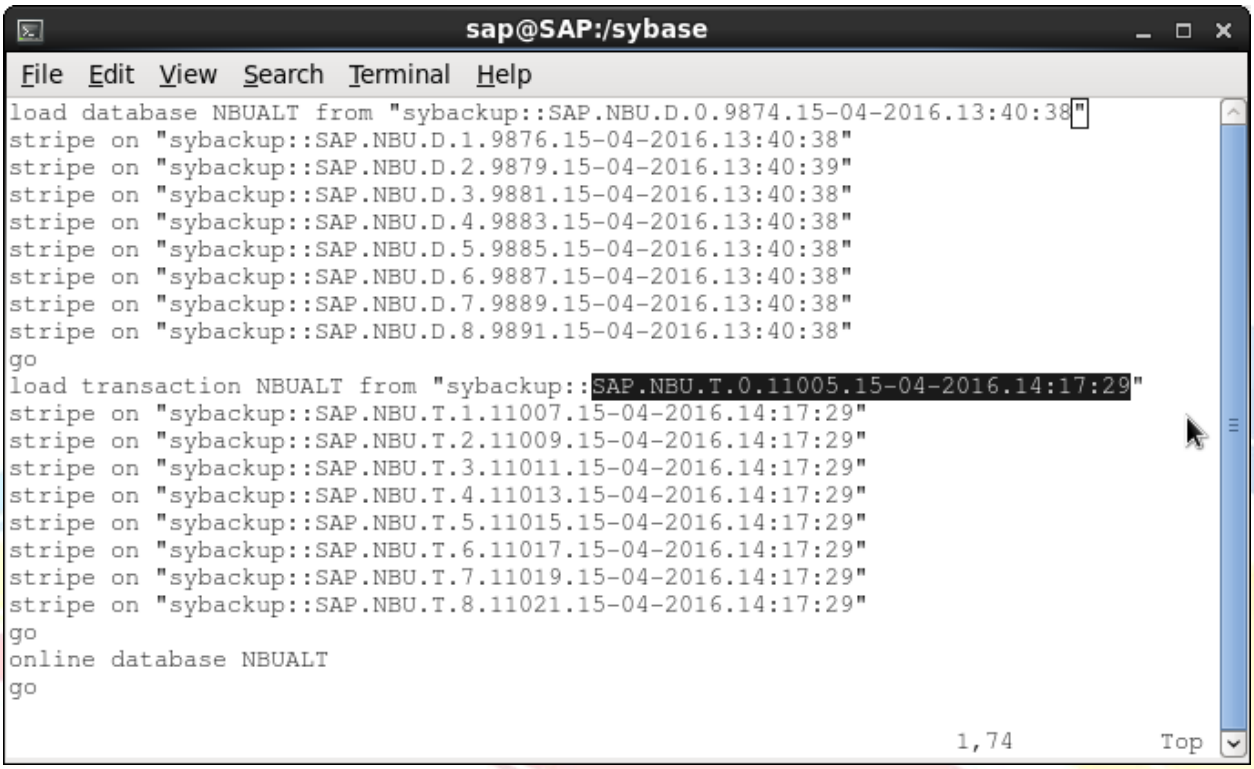
In the vi editing tool he will use the insert mode by pressing “i” key to edit the destination database for transaction log restore then pressing escape key to exit the editing mode.



In the vi editing tool he will use the insert mode by pressing “i” key to edit the database transaction log backup ID for restore then pressing escape key to exit the editing mode.

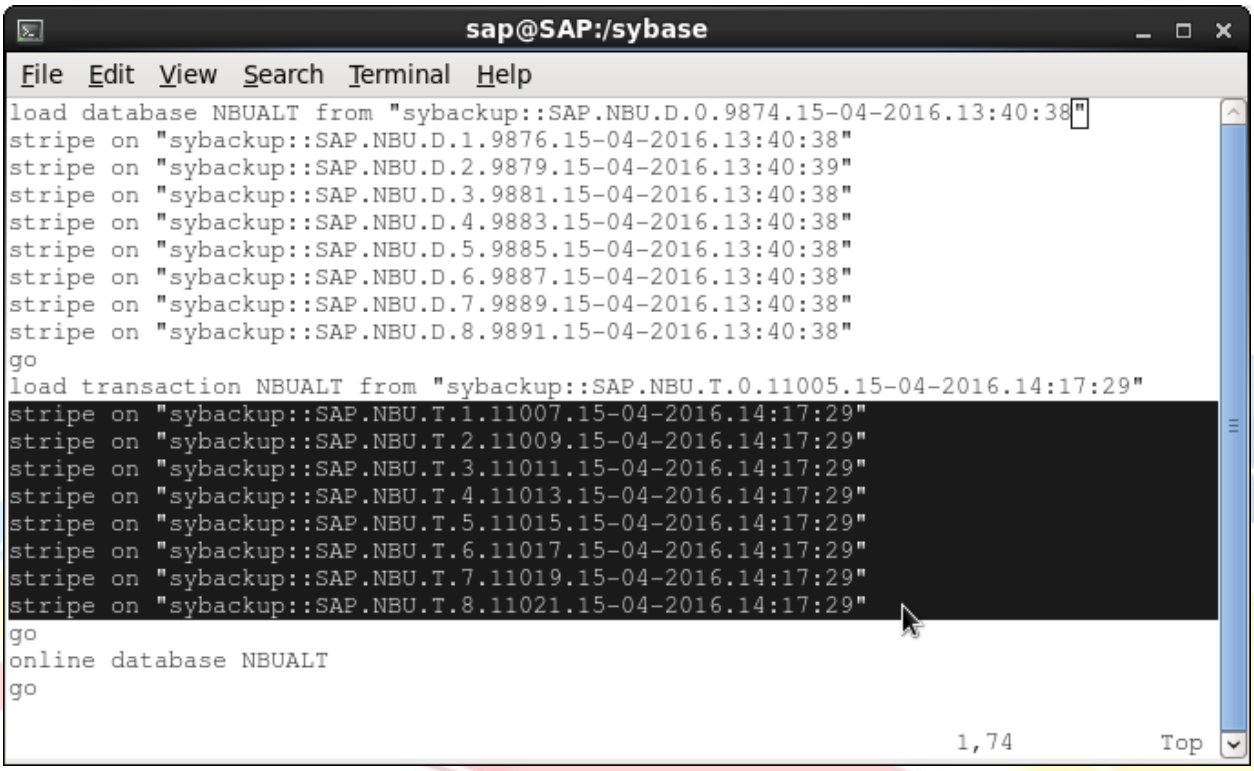
Note in case you did not use stripes in backup you will only need that line without the “stripe on” lines.

The database transaction log dump will always have stripe ID “0”.

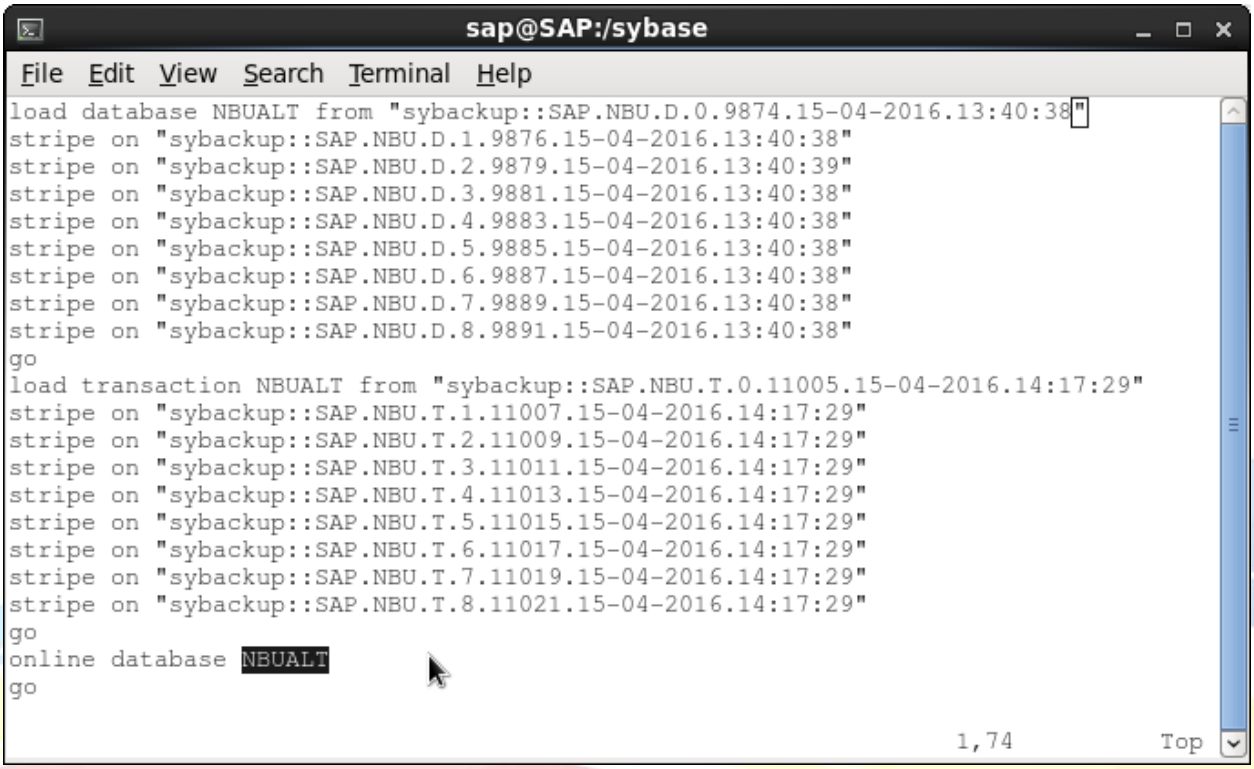


In the vi editing tool he will use the insert mode by pressing “i” key to edit the Stripe on lines according to the backup set available then pressing escape key to exit the editing mode.

Note in this case backup stripes are 8 starting 1 to 8 with the database transaction log dump backup ID stripe number 0.



In the vi editing tool he will use the insert mode by pressing “i” key to edit the database name to be online then pressing escape key to exit the editing mode.



After the editing is done you will press escape key to exit insert mode then input “:wq” and press enter to write changes and exit vi editing tool.

Creating a database for restore

The Sybase database administrator will create a proper database for restore if the original database is missing or to be retained for further investigation, being proper is to have enough space to accommodate the data and the logs being restored.

Creating Database using Isql

The Sybase database administrator will initialize a file for data and if the database uses log he will also initialize another file for logs.

From Terminal the Sybase Database Administrator will Change directory to /opt/sap/OCS-16_0/bin/ assuming that Sybase home is /opt/sap/

Then he will connect to the Sybase database server using ./isql –Usa –SSAP assuming that the Sybase database server name is SAP

Intercom
Empowering People & Business with Technology

After connecting and entering the password a similar query should be used

use master

go

disk init

name = "database data file logical name (dtadev)",

physname = "database data file physical path ending (file.dat)",

size = ########

go

➔ If the original database log is separate also create log device

disk init

name = "database log file logical name(logdev)",

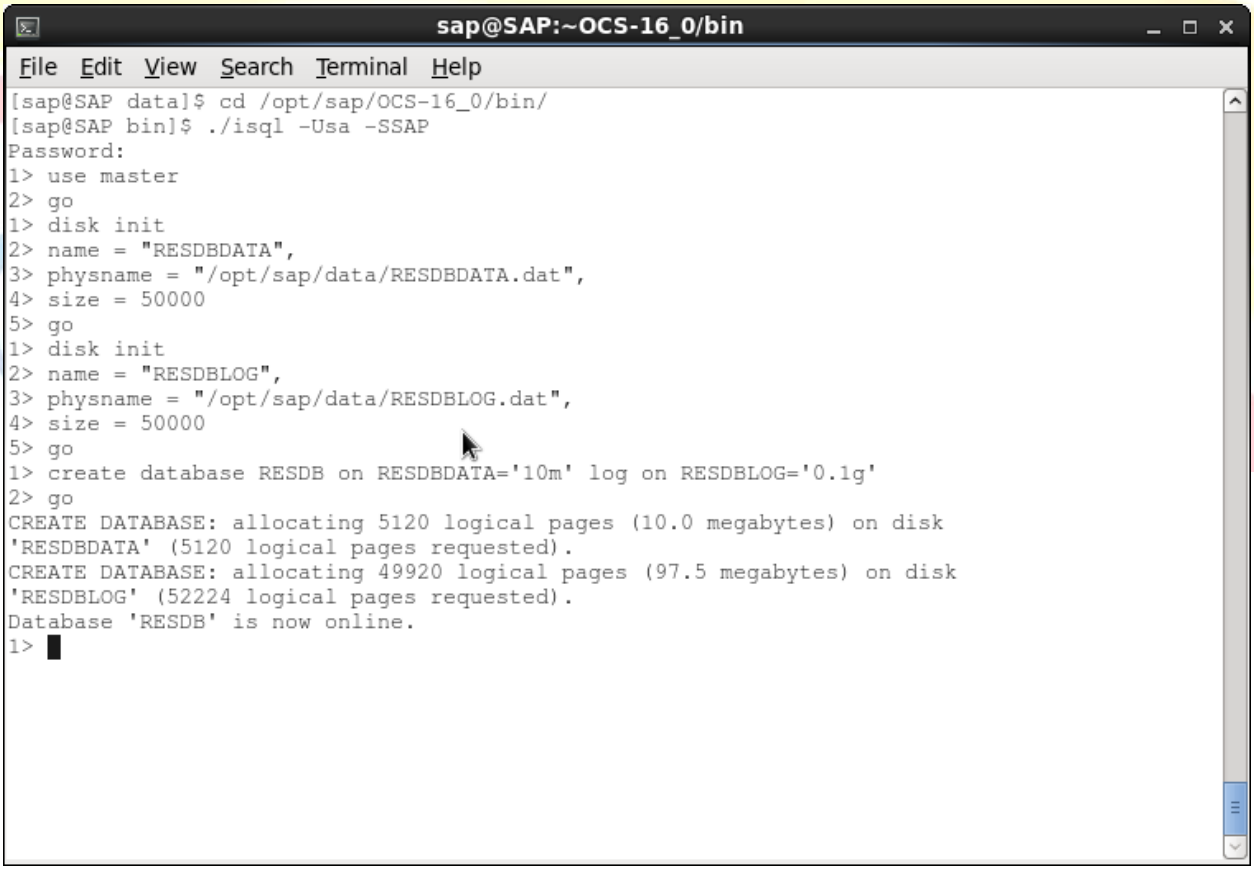
physname = "database log file physical path ending (file.dat)",

size = ########

go

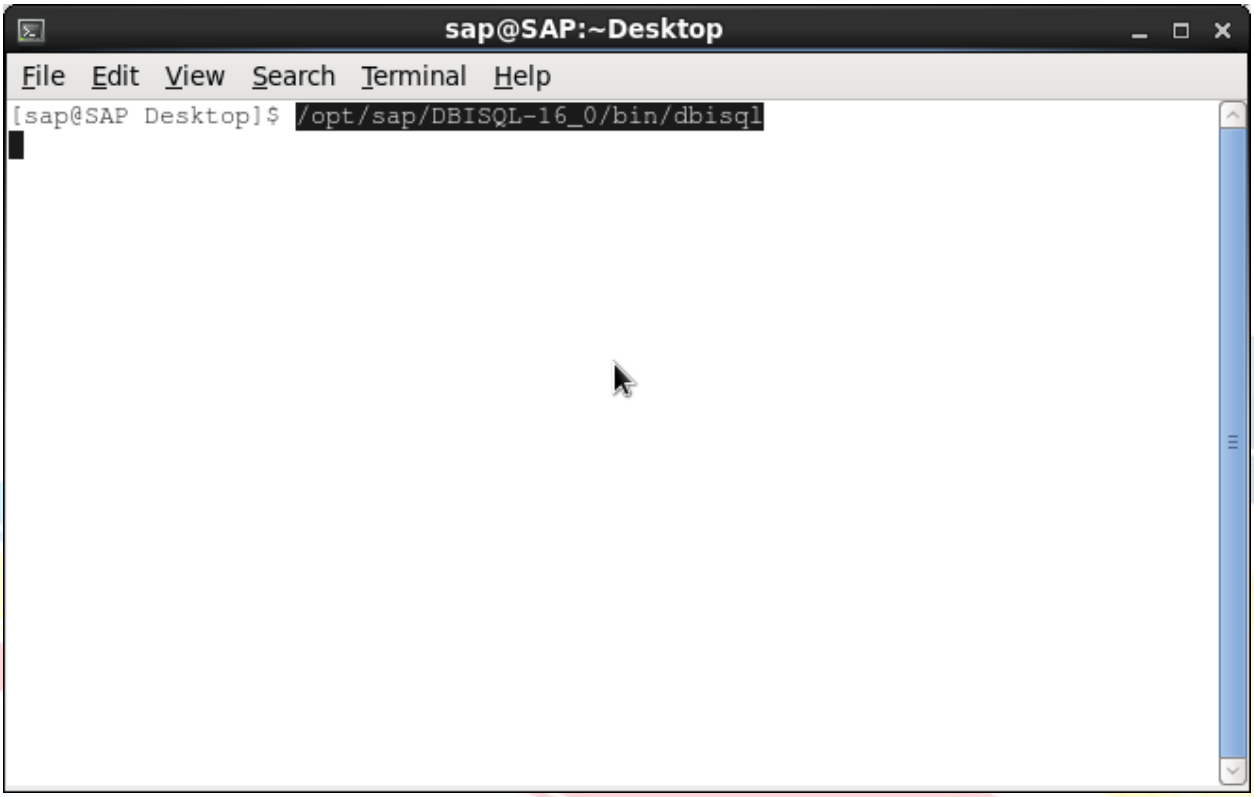
➔ Create the data base pointing at the devices that you created

create database "database name without qoutes" on datadev='###m' log on logdev='###.##g'

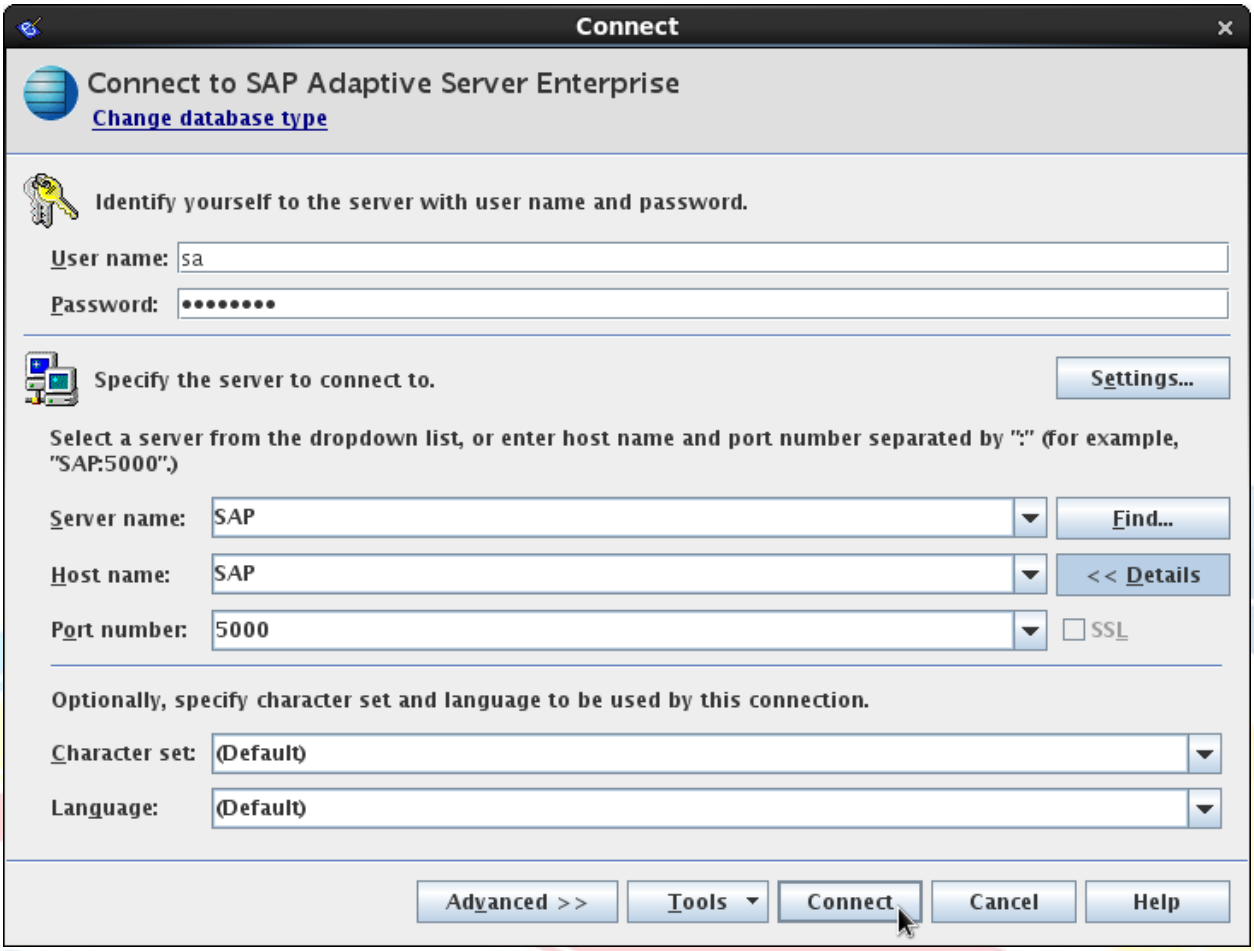


Creating Database using DBIsql

From Terminal the Sybase Database Administrator will run /opt/sap/DBISQL-16_0/bin/dbisql assuming that Sybase home is /opt/sap/



Then enters the prober user name and password to connect to the Sybase database server



After a successful login a similar query will be used

use master

go

disk init

name = "database data file logical name (dtadev)",

physname = "database data file physical path ending (file.dat)",

size = ########

go

➔ If the original database log is separate also create log device

disk init

name = "database log file logical name(logdev)",

physname = "database log file physical path ending (file.dat)",

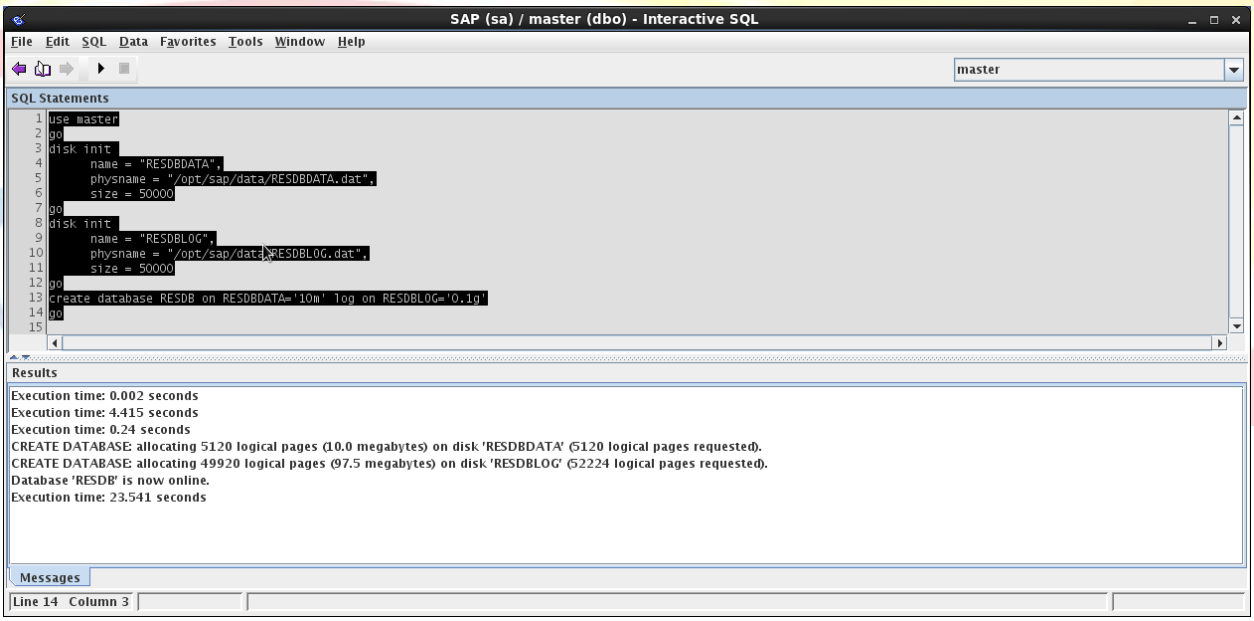
size = ########

go

➔ Create the data base pointing at the devices that you created

create database "database name without qoutes" on datadev='###m' log on logdev='###.##g'

F5 key to execute

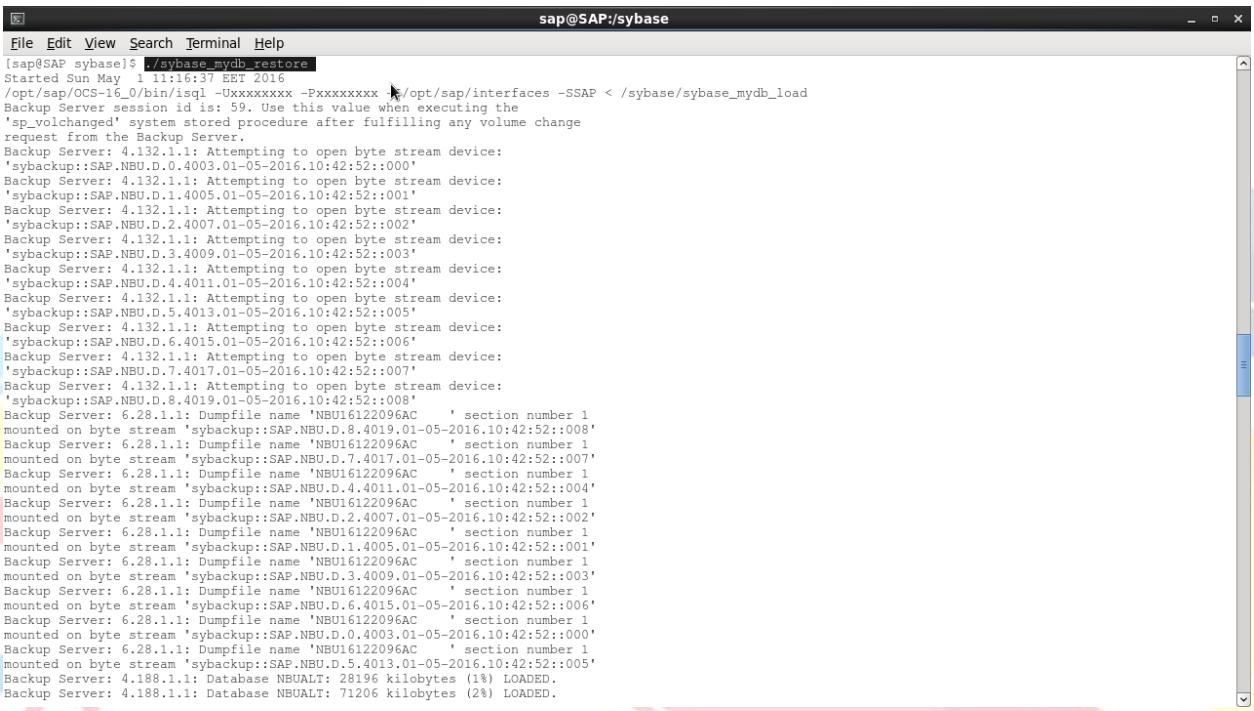


Initiating the Restore and Monitoring

Now you can sit back and take your breath, all what you have to do is to initiate the restore and monitor the progress.

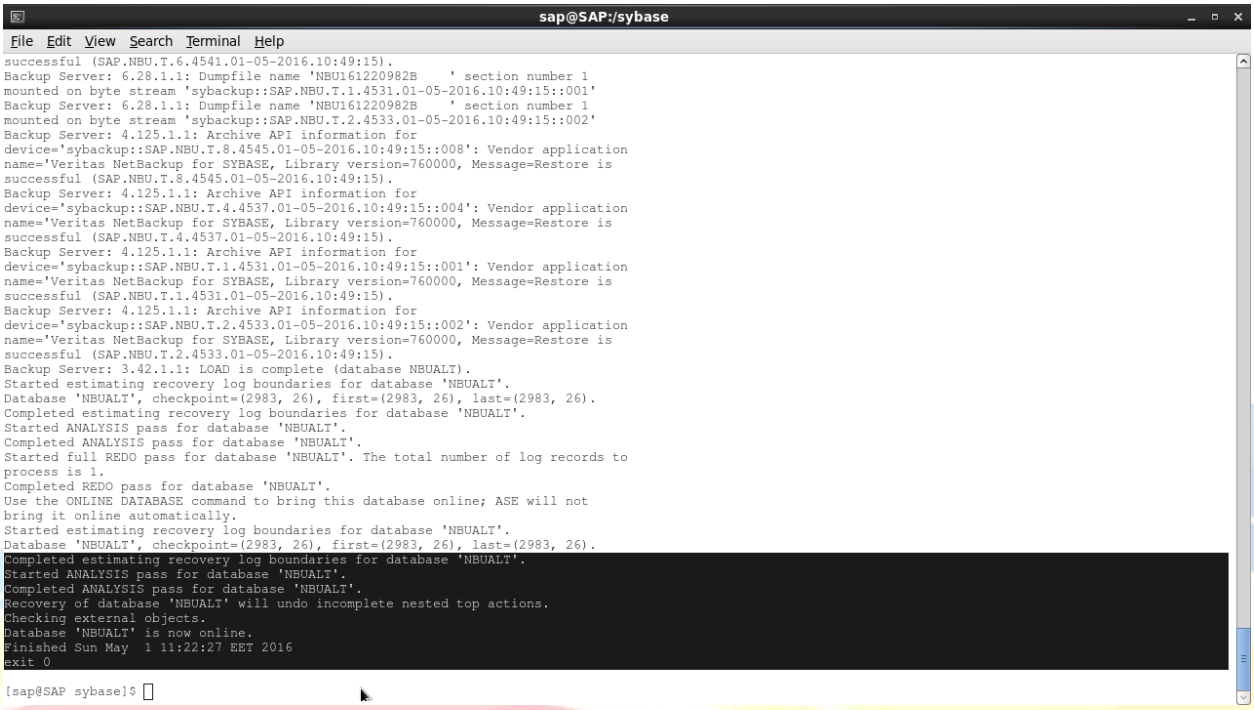
Initiating the Restore

Using terminal the Sybase database administrator executes the restore script after changing directory to "/sybase" by running "cd /sybase" then "./sybase_mydb_restore".



Monitoring the restore using terminal

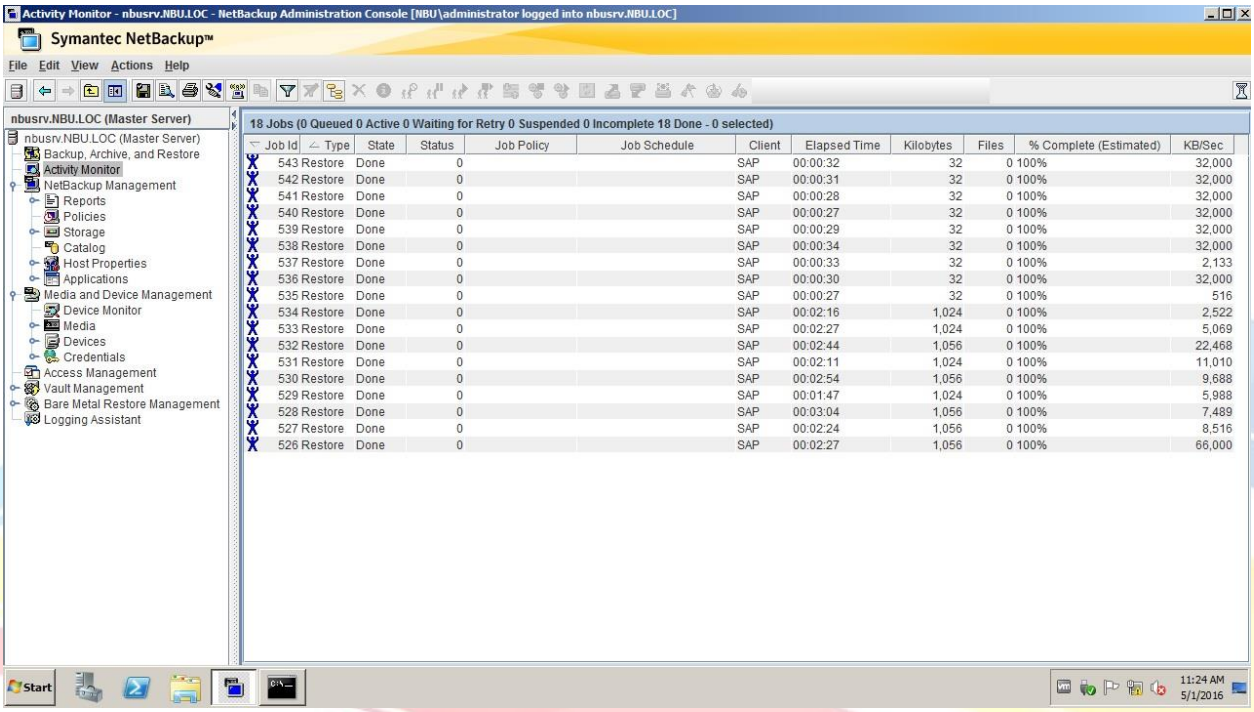
In the same terminal window you will have the progress printed to your screen and a successful restore should end like marked below.



Monitoring the restore using NBU GUI

The Netbackup administrator can also monitor the restore through the activity monitor on his Netbackup management console.

A successful restore will look like below.



Intercom
Empowering People & Business with Technology

Troubleshooting

This is the funny part that I love, I know that some of you disagree with me, but this is the part you get to know how Netbackup works in the background and become an expert.

Whenever you have backup or restore issues "/usr/openv/netbackup/logs/bphdb" log directory is your friend

Also for backup progress you may use "/usr/openv/netbackup/logs/sybackup" log directory.

The "NetBackup77_AdminGuide_Sybase.pdf" contains a trouble shooting chapter that is really helpful.