

Adaptive Enabling a “hello world” SAP System under Windows/MSSQL/NetApp



Applies to:

Adaptive Computing Controller 7.1 EHP1, released together with SAP NetWeaver 7.1 EHP1.

For more information, visit the [Landscape Design and Architecture homepage](#).

Summary

In this paper we will provide guidance in setting up an “adaptive enabled” landscape when the managed OS is Windows. We will use the installation of a “hello world” adaptive enabled 7.11 ABAP system as guidance through the general problem. In the end we will guide you through a “by hand” scenario that allows you to test the ability to relocate your system. That scenario should in principle always be executed before you start to manage an adaptive enabled SAP system by the ACC. The paper can be seen as a set of governance rules for an adaptive Windows landscape.

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Author Bio



I am a member of the development team of the Adaptive Computing Controller (ACC). I am working for SAP for roughly 10 years as Java Developer in various teams. In that time I have touched all software layers SAP has from the web front end to SAP backend management tools. The last area is the focus of my current work in the ACC team.

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Setup

The planning of the ACC landscape of managed computer systems and SAP systems must be done very carefully when using Windows as an operating system for the managed resources/systems, because Windows holds available a lot of pitfalls for adaptive installed SAP systems. In general there exist two ways to adaptive enable a SAP system:

1. Install it "adaptively" right from the start, to be discussed here under the restrictions given in the following.
2. Create a homogeneous system copy in a way that adaptively enables the system (not discussed here)

Said that to prepare the playing field, the problem to adaptive install has in general 4 dimensions:

- The used database and versions thereof
- The used SAP systems and versions thereof
- The used filer software and versions thereof
- The used OS and versions thereof

We can not provide a comprehensive documentation or guidance for the full problem here in one place. A SAP technical consultant can help by that job. We will only drill down to the problems that are specific for a landscape that plans to use the ACC and in detail here what is important if the OS of the managed systems is Windows. We will provide all links to the relevant documentation where necessary, but as a general warning: *the reader must be aware that he has to know all the information referred to and can not skim over it otherwise he will run into each pitfall and that will create a serious delay in creating/setting up the landscape.* In a first attempt to reduce the scope of the problem we will fix the last dimension to **Windows Server 2003 x86 64 SP2** since that is the most prominent Microsoft server version currently in use for Netweaver 7.11, for your SAP system consult the PAM and the latest SP for your Windows version. In the following we also will further reduce the complexity by restricting all remaining dimensions to:

- MSSQL 2005 SP3
- PI EHP 1 SP0 ABAP WEB AS
- NetApp SnapDrive 6.0.2.24.16, Server 6.0.2

The hope is of course that the transfer to other configurations is possible with moderate effort and the principle of the setup becomes clear.

In addition we will provide guidance in a "governance" approach. What we mean here is that in setting up an IT-Landscape you have an enormous level of freedom how to do that. If you use that freedom in a large landscape you harvest chaos. In such an environment you can only survive if you follow certain rules anew called "governance". In that sense the first guidance is the following:

We only support Windows as OS for ACC managed resources, SAP systems under the following prerequisites:

- **G0** Do not try to, think about, play with the idea to use High Availability (HA) together with ACC. The concepts simply do not play together. Especially do not use the only SAP supported HA solution Microsoft Cluster Service together with ACC.
- **G1** The resources are part of a Windows domain, i.e. you must set up a Windows domain controller
- **G2** The Windows domain controller is also the DNS
- **G3** The installation is done in that domain i.e. when starting the SAPinst installation you login as a domain administrator. Subsequently SAPinst will provide you with correct default settings during the installation.
- **G4** The Windows Domain effectively works as a directory service, there are other directory services available but we will not discuss the possibility to use them.

Usually you can rely on SAPinst to create the necessary users, groups and necessary rights (see below) on the initial installation host and in the domain.

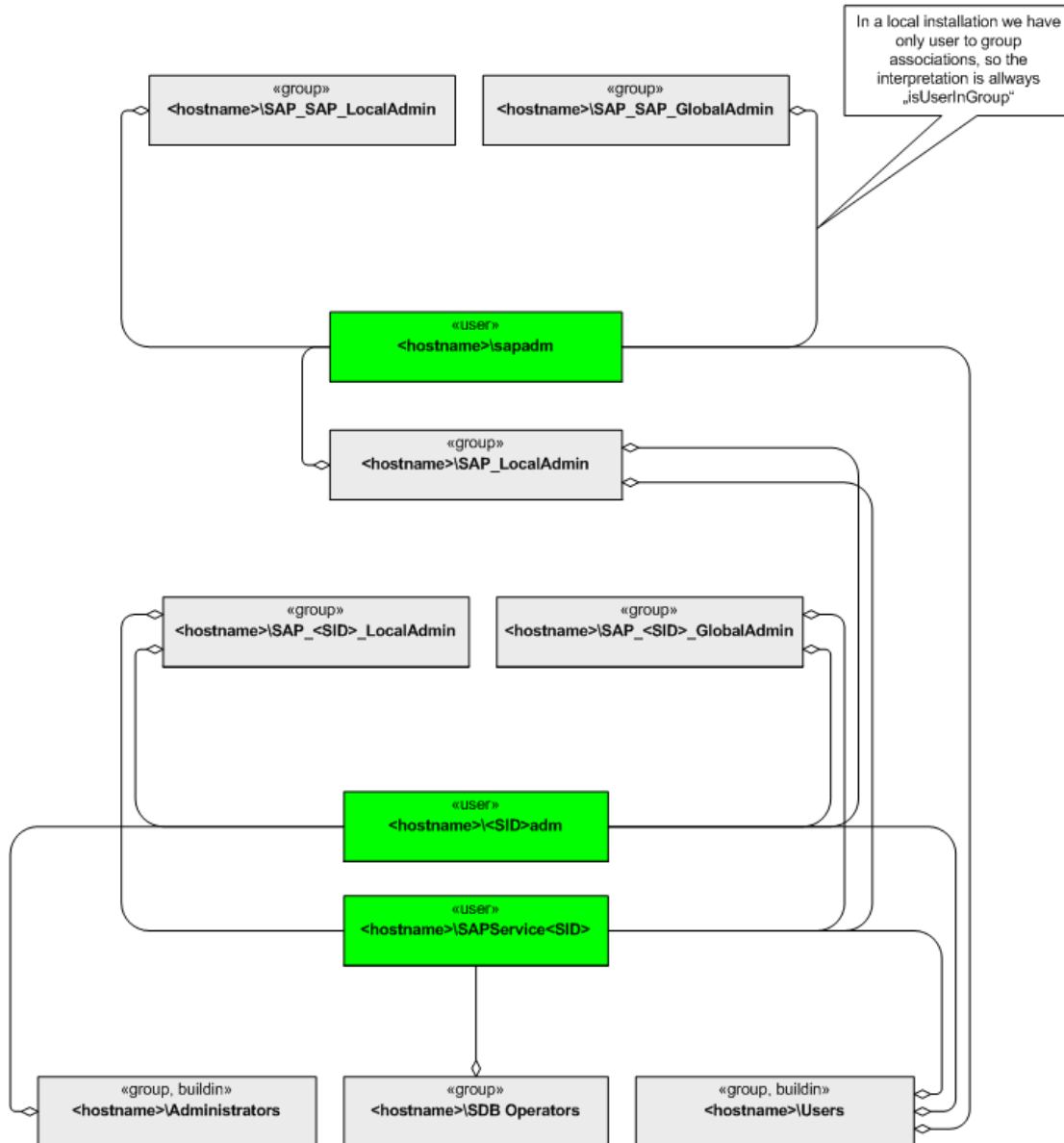
Windows User and Groups of SAP Systems

98% of all problems with adaptive managed systems can be traced back to security and authorization, that is especially true for Windows, therefore it is important to have an overview of the relevant users and groups. SAPinst supports two general types of installation: standalone and distributed.

Standalone Installation

When you install a standalone system with SAPinst i.e. all instances of the SAP system are installed on one physical host, usually done in the domain of the host, the following groups and user are created:

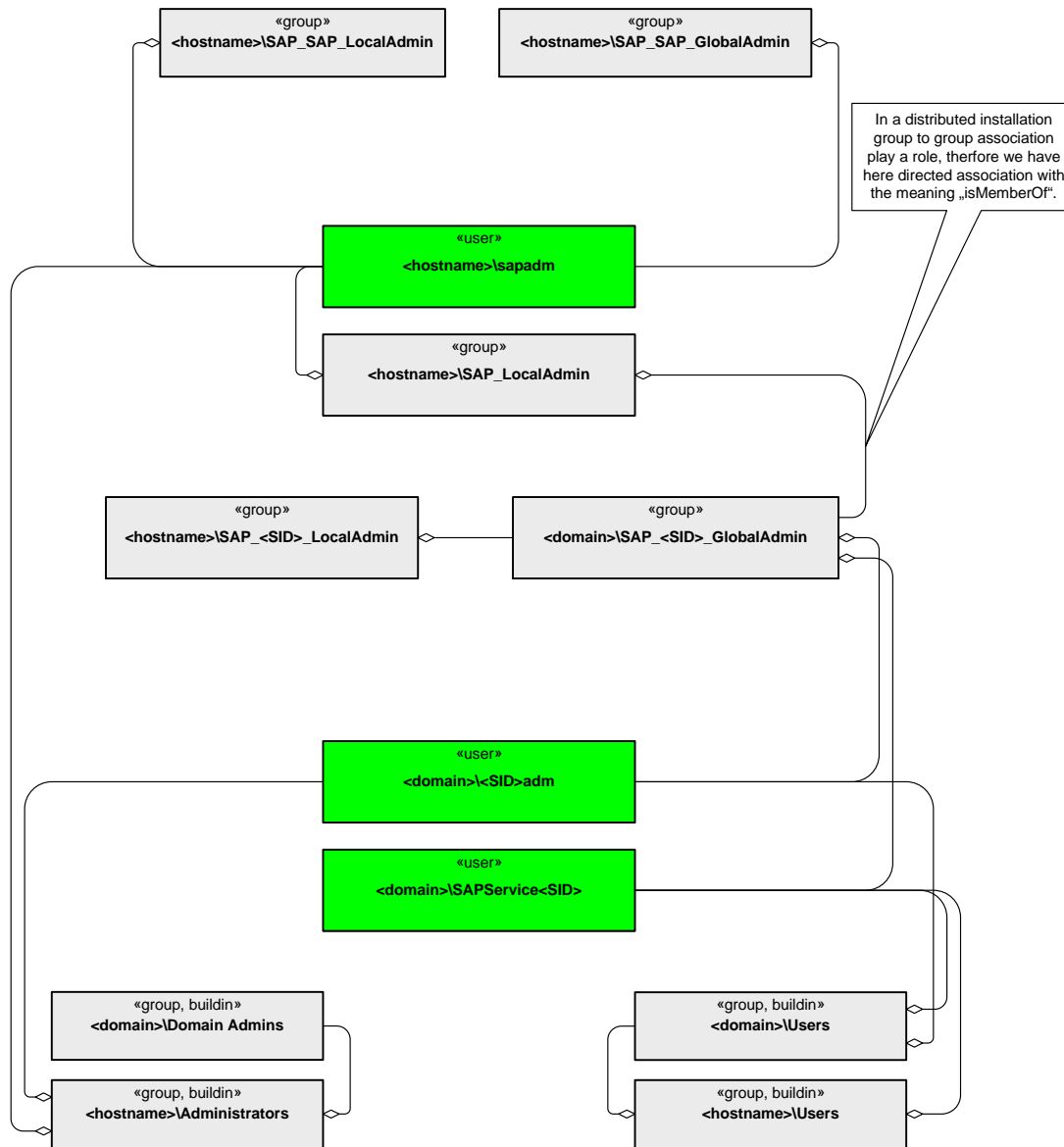
SAP specific groups and users for a local SAP installation



Distributed Installation

When you install a distributed system i.e. a SAP system where more than two resources (computer system or virtual machine) are used to host the SAP instances and the database, SAPinst usually creates the following user and groups:

SAP specific groups and users for a distributed SAP installation



The difference between the local and the distributed installation is that `<SID>adm` and the `SAPService<SID>` users are part of the domain and are no longer part of the local user group, they become part of the domain users and `SAP_<SID>_GlobalAdmin` groups and these two groups become part of the local users respectively `SAP_LocalAdmin`, `SAP_SID_LocalAdmin` groups.

In both cases these user/groups are relevant for processes of the SAP instances/systems and the file resources SAPinst creates during the installation. The interesting SAP processes are:

- The instance agent (sapsartsrv.exe of instance not of host agent!) "runs as" <domain>\SAPService<SID> as Windows service with name "SAP<SID>_<NR>". The <domain>\SAPService<SID> user therefore has not the right to login to the hosts.
- The host agent i.e. "sapstartsrv in host mode" "runs as" <hostname>\sapadm as Windows service with name "SAPHostControl". The <hostname>\sapadm user there for has not the right to login to the hosts.
- saphostexec runs as build in user NT Authority/SYSTEM as service with name "SAPHostExec"
- saposcol is not spawned as a service but as an independent process.

Access Rights to SAP Directories and Resources

On each host of a SAP system or instance the corresponding resources in the sense of file resources must be mounted and the corresponding user groups must have access rights to the resources respectively resources trees. Any resource in the "SAP directories" must have ACLs that only contain the following user groups:

- SYSTEM
- Group (local) Administrators
- Local Group SAP_<SID>_LocalAdmin

In details the ACLs must allow the control as:

- Group (local) SAP_<SID>_LocalAdmin has "Full Control" recursively on "usr\sap<SAPSID>"
- Group (local) SAP_LocalAdmin has "Full Control" on
 - usr
 - usr\sap
 - usr\sap\trans
 - usr\sap\prfclog

As a further governance rule for Windows as OS for ACC managed resources, SAP systems we found:

- **G5** You choose to install the host agent in the local domain of each resource, computer system

Installing a “hello world“ Adaptive Enabled SAP System

Now we will use the simplest reasonable SAP system an ABAP WebAS with one application server i.e. the scs instance and the unavoidable database as a guinea pig to extract the important steps to do in general to install an adaptive enabled SAP system. The installation of additional dialog instances is left as a home work ;-) (Was tested and works along the same line). The steps to be done can be categorized as follows:

- SAPInst installation preparation
- Windows computer system preparation
- MSSQL computer system preparation
- NetApp computer system preparation
- Post installation steps.

In the following chapters we will detail what has to be done.

After having done all necessary installation preparations SAPInst will guide you through the installation processes itself. To start the installation you have to find the “installation master” often abbreviated “IM” on your installation media. In the installation master you have to find the “sapinst.exe”. It will start the sapinst server and gui together. As a recommendation instruct sapinst to copy the “installation content” to a local temp disc. This is not necessary but it has shown that otherwise the installation often straggles, probably due to performance problems of the installation media (filer). (These 6 lines cost you in reality 2 days ;-)

During the run of SAPInst provides you various options, to see them all run SAPInst in “custom mode” so you are aware of all settings SAPInst does for you and you know where you can adjust the installation. As general governance rule :

- **G6** Use the defaults of SAPInst when ever possible.

SAPInst Installation Preparations

The following description and its terminology are based on a SAP Netweaver PI 7.1 EHP1 installation. So from now on we fix the second dimension by using only a **SAP Netweaver PI 7.1 EHP1 ABAP WebAS** installation.

When preparing an installation of a SAP system that is supposed to be managed by the ACC you must consider the following things:

- Read the SAP Installation Guide and SAP Technical Infrastructure Guide for you SAP System carefully (See [References](#)).
- Prepare the virtual host names (only short hostnames are allowed!) for each instance that is supposed to be managed independently. **G7 Use different virtual host names for each instance. Instances that have the same virtual name can only be relocated together. A parallel relocate of instances with the same virtual host is currently not enforced in the ACC and can lead to error situations.** Using the same virtual hostnames for a subset of ACC enabled instances foils the ACC concept and should not be done.
- Prepare the fixed IP addresses for these virtual host names.
- Play safe! Maintain your <path>/etc/hosts and <path>/etc/services file centrally and share it on all hosts. This only a fallback! When you are sure that your domain name service works flawlessly you can skip that step for the hosts file.
- Maintain the fix IP addresses in the DNS of Windows domain controller.
- You must install a distributed system.
- You install with virtual hostnames during the installation of your distributed system. i.e. you start SAPInst with the parameter SAPINST_USE_HOSTNAME=<virtual host name of instance to install or set up (in case of GLOBALHOST under Windows)>

- **G7 Think about the mount point structure of the SAP systems you want to manage with the ACC before you start the installation! And come up with your own governance rule with respect to that issue** If you do it the wrong way the mount point structure of your systems might prevent the efficient use of your host landscape because you get conflicts when trying to start multiple instances on one host. In the concrete case of our "hello world" SAP system things are still quite straight forward:
 - C:\user\sap\ - C:\MSSQL\There is currently a bug in SAPInst that prevents the installation below that path on drive C: because SAPInst does no sense the available space below the junctions. If you have that problem mount a LUN as e.g. drive D: and place all database files there.
 - In case you want additional dialog instances take care that the mount points of the instances are not descend or ascend nodes of each other otherwise the instances will block each other during relocate. Use instead e.g. the following mount points:
 - c:\usr\sap\MGL\SYS For system files of SAPGLOBALHOST instance
 - c:\usr\sap\MGL\DVEBMGS00 For shared services instance of SAPGLOBALHOST
 - c:\usr\sap\MGL\D01 For additional dialog instance
 - Size the LUNs correctly according to the requirements of SAPInst. (For creating the LUNS see AppendixV)
- Execute all tasks in all the following computer system preparation chapters **before** you start to use the computer systems as an adaptive enabled resource in the ACC

These recommendations are general valid. The point that refers to management of the "etc/hosts" file hints to another very important point in the preparation of your landscape: the preparation of each individual computer system/resource, i.e. in particular those hosts that are not used during the installation. On the hosts where you do your installation SAPInst does a couple of things you must do by hand on all the other hosts. We will detail that in the following chapter.

Windows Computer System Preparation

Especially under Windows you must carefully follow the recommendations given here to prepare ***each*** computer system individual. It might be possible that system management tools are available that can help you with that task but we can not give general advice with regard to that.

- You must take care that these local user groups exist on each host and have at least the following members:
 - Group SAP_LocalAdmin needs the members: Group <domain>\SAP_<SID>_GlobalAdmin
 - Group SAP_<SID>LocalAdmin needs the members: Group <domain>\SAP<SID>_GlobalAdmin

On the host where you do your distributed installation these groups and the necessary users will be created by SAPInst but on the other hosts you must take care of that job (or an appropriated tool).

- Install the most up to date host agent on each resource. This can be done on each resource - by hand or an appropriated tool. That installation creates you in any case the SAP_LocalAdmin group (see graphic).
- Add the following registry entries on each computer system **!TODO:JW MUST BE DONE BY HOSTAGENT! :**
 - below "HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\lanmanserver\parameters" add the entry with name "OptionalNames" and type Multi_String_Value as value and add the virtual names of all instances that are supposed to run on that machine.
 - Below HKEY_LOKAL_MACHINE\SYSTEM\CurrentControlSet\Control\Lsa add the entry with name "DisableLoopbackCheck" and type DWORD and value 1.

- Ensure that the lookup of the short virtual host names and the corresponding reverse lookup works in a given network for all sap instances and db instances that are in that network. (That is of course a general statement and not limited to Windows) To check that ensure that you can ping all virtual hostnames on all hosts of the network and that you also can do a reverse lookup by checking that ping -a <virtual-ip> works on all hosts of the network for all virtual ip addresses.
- Ensure that the Windows shares "saploc" and "sapmnt" exist on each computer system you want to use as host for a SAP instance. As with the user groups they are only created on the computer systems where you do your initial installation on the other computer systems you must take care of that job. When creating the shares use the shares of the initial installation host as blue print but grant access only to the SID independent user groups: Administrators and SAP_LocalAdmin rights (full control) on the shares. (see also the pictures above) **!TODO:JW MUST BE DONE BY HOSTAGENT/HOSTAGENT INSTALLATION!**

In addition to these Windows only specific preparations you must also consider that you want to be able to move you database and communicate with that database from each host in you landscape. Since MSSQL is the preferred database in the Windows environment we will from now on fix the first dimension of our initial problem to **MSSQL Server 2005 SP 3**.

MSSQL Server Computer System Preparation

When using MSSQL as database software on Windows you have to consider the following things for a landscape you want to manage with the ACC:

- Install the MSSQL Server Software on each host that should be able to host a DB instance (see [References SAP NOTES for MSSQL](#)).
- Install the Microsoft SQL Server Native Client on each host that should be able to host a SAP instance (see [References SAP NOTES for MSSQL](#)).
- Take care that the tempdb, that is a MSSQL Server system database, is not placed in the LUN of the data files of the database that belongs to SAP system you are about to install. The tempdb must remain **local on each db host!** Typically the location is something like C:\TEMPDB. (See below)
- Follow all SAP Notes in the category MSSQL Server in the Appendix (SAP NOTES for MSSQL) for detailed questions about versions, problems and installing MSSQL Server and client software.
- **G8 Ensure that you relocate databases only between machines that run compatible MSSQL server versions. At best ensure the MSSQL server versions are all the same in the pool/network in which you relocate. We currently have no tests that check consistency between DB and data files.**

In addition to these Windows only specific preparations and the MSSQL Server specific preparation you must also consider that you want to be able to mount the corresponding LUNs on the hosts of the SAP system respectively the host of the DB. **So you need on each host all software that is required by the sapacosprep library** provided by your storage partner. This **depends of course highly** on your hardware partner. We will discuss here only the case of NetApp iSCSI LUNs.

NetApp Windows Computer System Preparation

When using NetApp as your storage provider you will need the following software components on each potential host in your ACC landscape

- Microsoft iSCSI initiator (with all necessary patches for Microsoft Windows 2003 Server See [References](#))
- Snapdrive from NetApp in the latest Version (with all necessary patches for Microsoft Windows 2003 Server See [References](#))
- Maintain the ntp_srid.conf file so that all LUNs that are supposed to be mountable on a given host are entered in that file. What to enter is obvious after you created the LUNS (See Appendix [Creating LUNs with NatApp Snapdrive](#)). That effectively means the same as for the etc/hosts file respectively the etc/services file. You must share by some means that file in your landscape. (see below in the chapter Relocate by hand)

SAPInst Post Installation Steps

After your distributed installation you must the following steps:

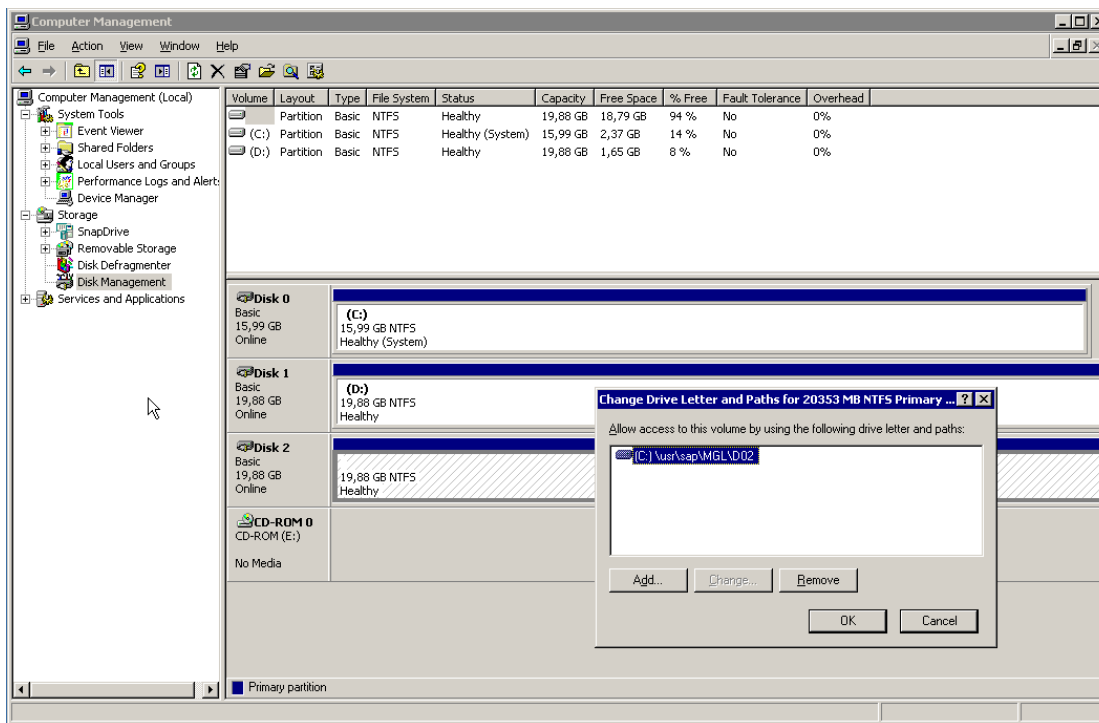
- On the domain controller you must give the corresponding <SID>adm a "roaming profile" (See references).
- Adjust the access rights on the resources in the LUNs (see next chapter)
- Adjust the SAP profile parameters as follows if not done by the installation (SAPLOCALHOSTFULL is not touched, created by SAPInst)
 - SAPLOCALHOST = <virtual host name of SAP instance>
 - SAPLOCALHOSTFULL = <virtual host name of SAP instance>
- Execute the profile manipulations as detailed in [Registry Entries and Important Context Variables](#).
- Currently we have a problem under Windows if the system has more than one sap instance. The problem is that we must prepare the instance of SAPGLOBALHOST before the remaining instances. Currently we prepare all instances in parallel that leads in the case of more than 2 instances in more than 50% of all relocate to a problem and the relocate will be stopped. Therefore workaround is necessary as described in [Appendix VIII Avoiding "SAPGLOBALHOST first" problem during preparation](#)

Access Rights Handling for Mounted LUNS under WINDOWS

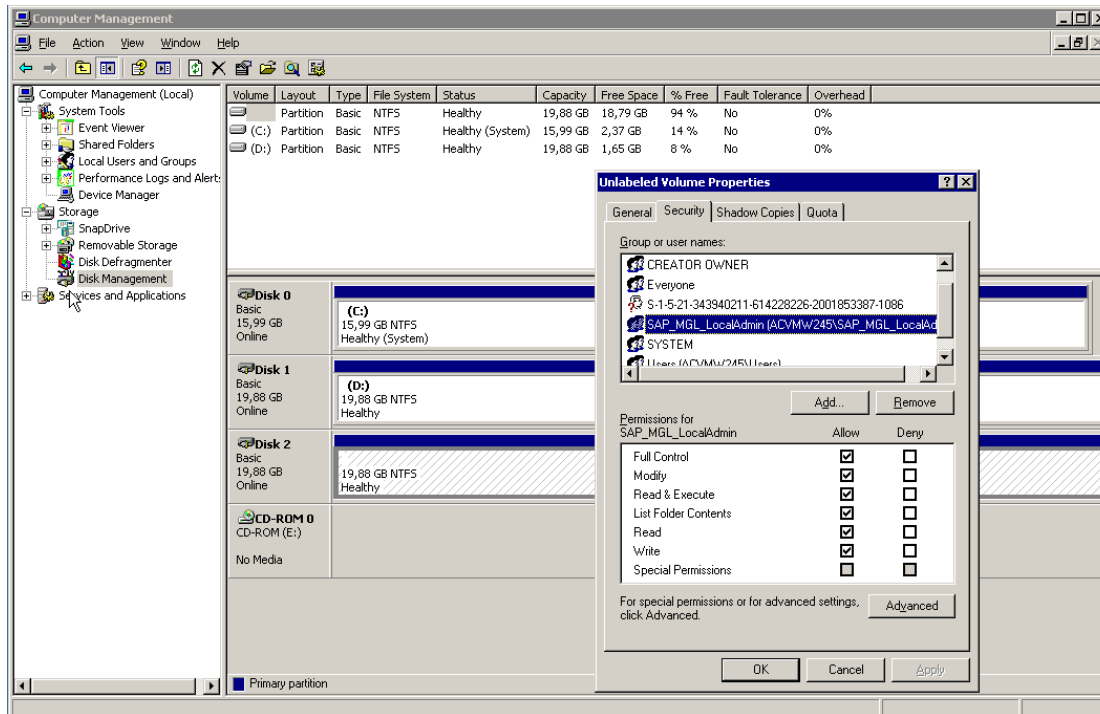
When you do a distributed installation that is adaptive enabled you install the services and the database and or the database files into LUNS. Two very important aspects for the ACC are a) the fact that security credentials under Windows are not inherited over junctions and b) SAPinst uses a local group SAP_<SID>_LocalAdmin to grant access rights on the SAP directory tree (see [Technical Installation guide](#))! ***You must replace that local group with the global group SAP <SID> GlobalAdmin from the domain!***

The background behind that is, that SAPinst ***grants access rights based on a local group***. In the picture of the [user groups in a distributed installation](#) you can see that the relevant <SID> specific users <sid>adm and SAPService<SID> are domain users and are assigned via the domain group SAP_<SID>_GlobalAdmin to the local group SAP_<SID>_LocalAdmin that group must have recursively full access to the resource tree below e.g. C:\usr\sap\<SID>. Now that is done on the installation host initially by SAPinst. The problem comes now when you create a mount point below that path or at latest when you mount the LUNs on another host. The problem is two fold:

1. The inheritance of the credentials does not work over junctions.
2. The user group SAP_<SID>_LocalAdmin is local group. Windows keeps track of its users and groups by using GUIDS (see second picture below). For the generation of the GUIDS Windows uses for its local groups and users the Windows sid! So the Group SAP_<SID>_LocalAdmin is on each machine another group i.e. an unknown group. For example see the second picture below the group guid that can not be resolved is the SAP_<SID>_LocalAdmin from the second host used in the demo landscape. ***That problem can only be overcome when you replace after the installation the local group SAP LocalAdmin with the global group SAP <SID> GlobalAdmin on all LUNs!***



Disc 2 represents the LUN mounted below C:\usr\sap\MGL\D02, i.e. the LUN for the dialog instance D02.

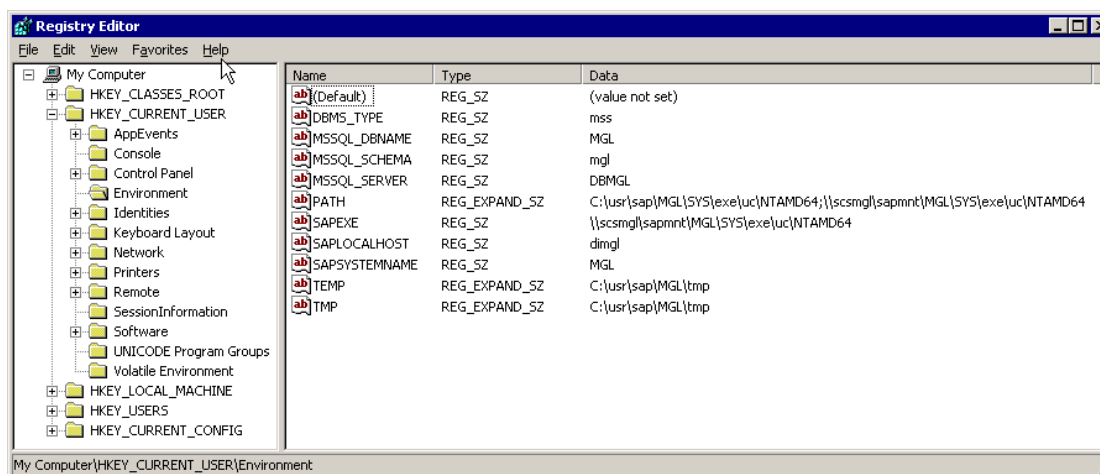


Security credentials of disk 2 on acvm1245, the guid that can not be resolved is the guid of the local group SAP_<SID>_LocalAdmin on acvmw246!

Registry Entries and Important Context Variables

During installation of the SAP system respectively any SAP instances SAPinst creates certain registry entries that are relevant for the SAP users <hostname>\sapadm, <domain>\<SID>adm and <domain>\SAPService<SID> and generally for the correct functioning of the SAP instances on the given host. A part of these entries become e.g. context variables for the sap users. In case of the MSSQL database the environment of the <SID>adm looks like the following and can be found under:

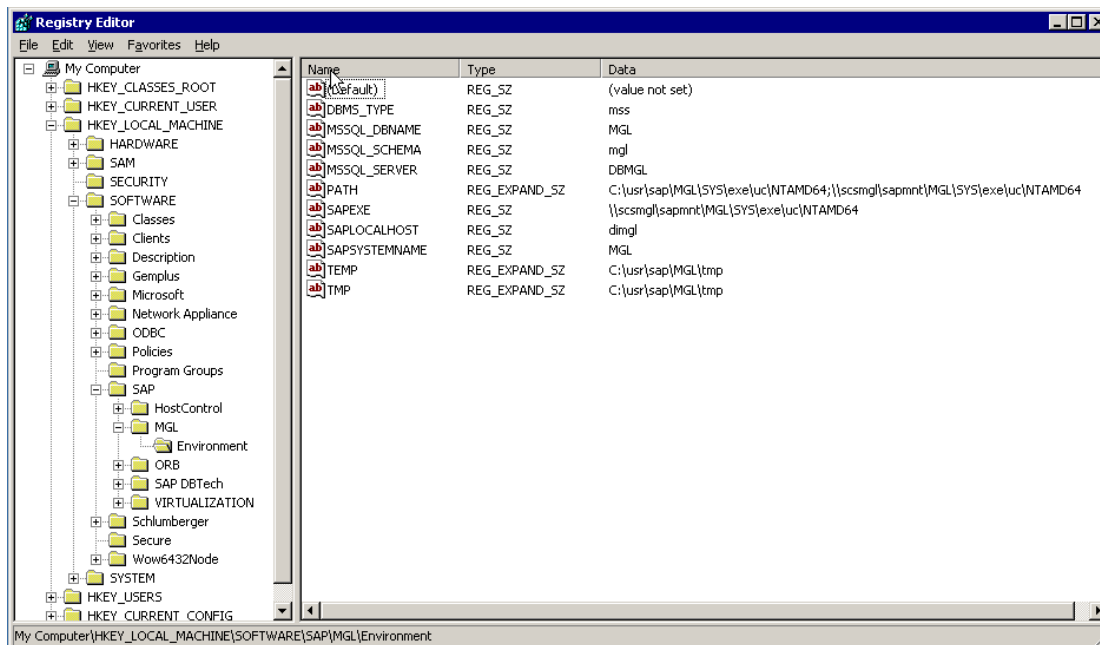
HKEY_CURRENT_USER\Environment



The environment of the SAPService<SID> user can be found under:

HKEY_LOCAL_MACHINE\SOFTWARE\SAP\MGL\Environment

And looks in case of the MGL system like:



These environments should be the same. The command line tool: `ntreg2cmd.exe`, that is part of the SAP kernel, allows you to extract the relevant environment variables in a windows command file. That can be used to add `SETENV_XX` commands in the profile of the system. Ensure that you have patched the instance agent up to 7.0 patch level 179 otherwise the `SETENV_XX` command does not function properly. As an example see the `default.pf` below.

- **DBMS_TYPE** Here "mss" for Microsoft SQL Server depends on the db type of you system must be set in the profiles (see below)
- **MSSQL_DBNAME** Here "MGL" the name of the database that belongs to the system must be set in the profiles (see below)
- **MSSQL_SCHEMA** Here "mgl" the name schema of the database that belongs to the system must be set in the profiles (see below)
- **MSSQL_SERVER** Here "DBMGL" the virtual host name of the server that hosts the Microsoft SQL Server with the system database must be set in the profiles (see below)
- **PATH** The PATH environment variable the user <SID>adm respectively SAPService<SID> will see. Set it to `PATH=$(DIR_EXECUTABLE);%(PATH)`
- **SAPEXE** You will get that value from the `ntreg2cmd` tool ensure it points to the `SAPGLOBALHOST` server.
- **SAPLOCALHOST** The virtual host name used last to install a SAP instance on that host. In case of adaptive computing irrelevant since the `saplocalhost` name of the profiles of the instances that are bound to the host are those values that are active.
- **SAPSYSTEMNAME** The SAP SID here MGL
- **TEMP** Here "C:\usr\sap\MGL\tmp". Must be set in the profile to another value because that path does not exist on each host. See below.

- TMP Here "C:\usr\sap\MGL\tmp". Must be set in the profile to another value because that path does not exist on each host. See below.

SAPInst adds these environment variables to the registry for each host where you install an instance. To ensure that these environment variables ***are present on a new host that has not been used during the installation of the system you must enter these data into the profiles of the system:*** (the default.pfl of the system MGL):

SAPSYSTEMNAME = MGL

SAPGLOBALHOST = scsmgl

system/type = ABAP

login/system_client = 001

SAPDBHOST = DBMGL

dbms/type = mss

dbs/mss/server = DBMGL

dbs/mss/dbname = MGL

dbs/mss/schema = mgl

rdisp/bufrefmode = sendon,exeauto

#-----

SAP Message Server for ABAP

#-----

rdisp/mshost = scsmgl

rdisp/msserv = sapmsMGL

rdisp/msserv_internal = 3900

rdisp/TRACE = 1

#rdisp/TRACE_COMPS = XP

#Added for Registry independent environment variables

SETENV_00 = PATH=\$(DIR_EXECUTABLE);%(PATH)

SETENV_01 = TEMP=%USERPROFILE%\Local Settings\Temp

SETENV_02 = TMP=%USERPROFILE%\Local Settings\Temp

SETENV_03 = SAPLOCALHOST=scsmgl


```
SETENV_04 = SAPSYSTEMNAME=MGL
```

```
SETENV_05 = SAPEXE= \\scsmg\sapmnt\MGL\SYS\exe\uc\NTAMD64
```

```
SETENV_06 = DBMS_TYPE=mss
```

```
SETENV_07 = MSSQL_SERVER=DBMGL
```

```
SETENV_08 = MSSQL_DBNAME=MGL
```

```
SETENV_09 = MSSQL_SCHEMA=mgj
```

If you want to logon as <SID>adm on a machine where SAPIInst did not create these registry entries you must use the tool nreg2env.exe/env2ntreg.exe to export/import the registry entries. So it depends, if you don't want to logon to the computer systems as <sid>adm the manipulation of the profiles suffices to ensure proper working of you ACC enabled systems, if you want to logon as <sid>adm you need the "nreg2env.exe/env2ntreg.exe to export/import" steps on each machine.

Relocate by Hand

After the installation is finished we have of course to test the ability to relocate the system. Here we relocate the full system at once. For our simplest possible SAP System you could write 2 additional test plans to relocate single instances.

The reason to do that by hand on the command line should be obvious. If you register the system and the resources in the ACC and operate from the ACC and get problems with the system you will end up on the command line this or the other way. Actually this is an other governance rule:

- **G9: Start and stop your adaptively installed SAP system at least once completely by hand before you register it in the ACC.**

When you run that test plan you must take care to execute it ***really sequentially***, otherwise you could in the worst case wreck your installation and data.

Stop SAP Instances by Hand on Host A

You stop a SAP system by hand via the command, for the parameters see [sapcontrol command line interface](#):

```
%HOST_AGENT_HOME%\exe>sapcontrol -user <SID>adm <password> -nr <INST_NR> -function StopSystem ALL
```

The result of the command can be controlled by watching the result of one of the following two commands:

- %HOST_AGENT_HOME%\exe>sapcontrol -nr <INST_NR> -function GetSystemInstanceList
- %HOST_AGENT_HOME%\exe>sapcontrol -nr <INST_NR> -function GetProcessList

and is returned at the end.

Stop Database by Hand on Host A

You stop a database by hand via the command, for the parameters see [saphostctrl command line interface](#):

```
%HOST_AGENT_HOME%\exe>saphostctrl -user sapadm <password> -function StopDatabase -dbname <SID> -dbtype mss -dbhost <virtualhostname-of-db> -dbuser <sid> -dbpass <sid-login-password>
```

The result of the command can be controlled by watching the result of one of the following two commands:

- %HOST_AGENT_HOME%\exe>saphostctrl -function ListDatabases
- %HOST_AGENT_HOME%\exe>saphostctrl.exe -user sapadm <sapadm pwd> -function GetDatabaseStatus -dbname <SID> -dbtype mss -dbhost <virtual host name of DB>

and is at the end returned.

Unregister SAP Instance Agents by Hand on Host A

You stop and unregister the SAP instance agent for the SAP instances running on your host via the command e.g., for the parameters see [saphostctrl command line interface](#):

```
%HOST_AGENT_HOME%\exe> saphostctrl.exe -user sapadm <sapadm pwd> -function UnregisterInstanceService -sid <SID> -nr <instance number> -saplocalhost <virtual host name of instance>
```

You can check the result of the operation by executing the Windows command to list all active services:

- Net start

The service SAP<SID>_<NR> should be gone after unregistering. In case of trouble you can clean up the service with:

- sc delete SAP<SID>_<NR>

Detach Database by Hand on Host A

You detach a database via the command, for the parameters see [saphostctrl command line interface](#):

```
%HOST_AGENT_HOME%\exe> saphostctrl.exe -user sapadm <password> -function DetachDatabase -dbconfdir <dir above dbmssctrl_MGL.cfg> -dbname <SID> -dbtype mss -dbhost <virtual host name of db> -dbuser <sid> -dbpass <sid-login-password>
```

The success of the command is finally returned. The necessary parameter dbconfig dir can be fetched by executing the command:

```
%HOST_AGENT_HOME%\exe>saphostctrl -function GetDatabaseProperties -dbname <SID> -dbtype mss
```

The result will look like:

Webmethod returned successfully

```
----- Database Properties ---
Database/IsRelocationTarget=true
Database/IsRelocatable=true
Database/IsSharedInstance=true
Database/IsSharedNetService=false
Database/MaxPhysMemSize=1535
Database/CPUCount=2
Database/ConfigurationDirectory/Default=D:\MGLDATA0
Database/DBRelease=9.00.4035.00
```

Umount LUNs by Hand on Host A

You can umount the LUNs via the command `sapacosprep` via the command e.g. for the parameter see [sapacosprep command line interface](#):

```
%HOST_AGENT_HOME%\exe> sapacosprep.exe -a umountSR -m MGL -t ISCSI -p NTP
```

The one and only input needed here is maintained in the file `ntp_srid.conf` used by the `sapacosprep` library from NetApp. It looks like e.g.:

```
MGL aip900n2:/vol/vol1/ACCWIN/MGL NTFS c:\usr\sap\MGL\
MGLDATA aip900n2:/vol/vol1/ACCWIN/MGLDATA NTFS c:\MSSQL\MGL\
MGLMSSDATA aip900n2:/vol/vol1/ACCWIN/MGLMSSDATA NTFS D:
```

So for the storage type SR the mount point (**MGL**) is actually a meaning less string that is used as a key in text file read by the storage lib!

When creating the LUNs for the SAP instances and the database that file must be maintained and distributed in the landscape. In that file you also see the mount points for the LUN that are realized as junctions when mounted.

Unbind Virtual ips/Hostnames by Hand on Host A

Finally we must unbind the IP addresses of the SAP and database instances bound to the network adapter. We can do that by executing the command, for the parameters see [sapacosprep command line interface](#):

```
%HOST_AGENT_HOME%\exe> sapacosprep -a ifdown -i <windows interface name> -h <virtual host name of sap respectively db instance> -n <network mask> -b <network broadcast>
```

The success of the command can A: be checked with `ipconfig` under Windows and B: is reported by the command. The name of the interface is usually not so obvious.

To determine the name of the network interface for argument `-i`, you can open **regedit**, search for path : `HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Control\network`. There is normally in the first interface a folder **Connection** and in this, there is a field **Name**. This describes the interface. If it is a phrase like **Local Area Network**, use quotes for `sapacosprep` like in `-i "Local Area Network"`. If you cant find the entry, search for an entry **IpCheckingEnabled**. The interface name is usually next to it.

Bind virtual ips/Hostnames by Hand on Host B

On host B we must bind the IP addresses and virtual host names of the SAP and database instances to the network adapter. We can do that by executing the command, for the parameters see [sapacosprep command line interface](#):

```
%HOST_AGENT_HOME%\exe> sapacosprep -a ifup -i <windows interface name> -h <virtual name of sap
respectively db instance> -n <network mask> -b <network broadcast>
```

Play save by checking that the name resolution and reverse look up works for all addresses by using

- ping <virtual host name>
- ping -a <virtual ip address>

for each address, name from a host in the network.

Mount LUNs by Hand on Host B

On host B we must mount all necessary LUNs by executing e.g the sapacosprep command, for the parameters see [sapacosprep command line interface](#):

```
%HOST_AGENT_HOME%\exe> sapacosprep.exe -a mountSR -m <SID> -t ISCSI -p NTP
```

Attach Database by Hand on Host B

On host B we must attach the database again with the command, for the parameters see [saphostctrl command line interface](#):

```
%HOST_AGENT_HOME%\exe>saphostctrl.exe -user sapadm <sapadmpasswd> -function AttachDatabase -
dbconfdir <dir above dbmssctrl_MGL.cfg> -dbname <SID> -dbtype mss -dbhost <virtualhostname of db> -
dbuser <sid> -dbpass <sid-login-password>
```

After successful attaching the database we can check the status of the database again with e.g.

```
%HOST_AGENT_HOME%\exe>saphostctrl -function ListDatabases
```

Start Database by Hand on Host B

After attaching the database the database is actually immediately online so no start database is necessary. **!THIS IS A BUG!** In case you stopped it for any reasons by hand start it now again with, for the parameters see [saphostctrl command line interface](#):

```
%HOST_AGENT_HOME%\exe> saphostctrl.exe -user sapadm <sapadmpasswd> -function StartDatabase -
dbname <SID> -dbtype mss -dbhost <virtualhostname of db> -dbuser <sid> -dbpass <sid-login-password>
```

After that we can now continue with bringing up the SAP instances.

Register SAP Instance Agents by Hand on Host B

Before starting a SAP instance you must register the instance agent as a Windows service with the command, for the parameters see [saphostctrl command line interface](#):

```
%HOST_AGENT_HOME%\exe> saphostctrl.exe -user sapadm <sapadmpasswd> -function
RegisterInstanceService -profile
<virtualhostname of SAPGLOBALHOST>\sapmnt\<SID>\SYS\profile\<startprofilename -sid <SID> -nr
<Service number> -saplocalhost <virtual host name of service> -srvuser <domain>\SAPservice<SID> -
srypass <password of <domain>\SAPservice<SID>>
```

You check the result with in the services view or via the command line command "net start".

Start SAP Instances by Hand on Host B

You start a SAP system by hand via the command, for the parameters see [sapcontrol command line interface](#):

```
%HOST_AGENT_HOME%\exe>sapcontrol -user <SID>adm <password> -nr <INST_NR> -function
StartSystem ALL
```

Respectively

```
%HOST_AGENT_HOME%\exe>sapcontrol -user <SID>adm <password> -nr <INST_NR> -function Start
```

to start the SAP instances one by one (please in the correct sequence!).

The result of the command can be controlled by watching the result of on of the following two commands:

- %HOST_AGENT_HOME%\exe>sapcontrol -nr <INST_NR> -function GetSystemInstanceList
- %HOST_AGENT_HOME%\exe>sapcontrol -nr <INST_NR> -function GetProcessList

When you arrived here congratulate your self ;-)

Managing via ACC

The aim of the game is of course not to manage your system from the command line. The obvious reasons for that are:

1. Does not scale in large landscapes
2. No protection against executing the wrong operation
3. No logging
4. No monitoring
5. No central overview

So now we must configure the system in the ACC. I will not get in to the details how to configure systems and resources in the ACC. For that we have the general SAP ACC documentation (See [References](#)). The steps to be done are:

1. Create a pool for your computer systems and SAP systems
2. Create a network for you computer systems and SAP systems
3. Run detect resources for your computing resources
4. Run detect services for you SAP systems.

After that you are ready to start and stop your SAP systems but of course you want to be able to relocate there for you must "adaptive enable" your systems and resources.

Configuring Resources

With regard to resources one thing is tricky under Windows: the name of the network interface id, here the same recommendation as given in [unbind by hand](#) is valid and retrieve from host agent does not work **!TODO:JW HOST_AGENT_TODO!**.

The screenshot displays the SAP Adaptive Configuration Center (ACC) interface. At the top, there is a table with columns: Resource, AC Managed, AC Enabled, AC Operational, Pool, Network(s), OS, OS Version, and CPU Type. Two rows are visible, both highlighted in yellow:

Resource	AC Managed	AC Enabled	AC Operational	Pool	Network(s)	OS	OS Version	CPU Type
activw245	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	WindowsPool	WindowsNetwork	Windows NT	Windows 2003	X86_64
ocmvw248	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	WindowsPool	WindowsNetwork	Windows NT	Windows 2003	X86_64

Below the table, the 'Configuration Steps' section shows a progress bar with 'Step 1' selected. The 'Adaptive Enablement' section has checkboxes for 'AC Enabled' and 'AC Operational', both of which are checked. The 'Capabilities' section shows 'Available SAPs' set to 'S00'. The 'Network Assignment' section includes an 'Add' button, a dropdown for 'Auto create assignments: Yes', a 'Retrieve interfaces from Host Agent' button, a 'Timeout (sec): 10' field, and a 'New Interface ID' field. Below this, a tree view shows 'Local Area Connection' expanded to show 'WindowsNetwork'.

Configuring Services

With regard to the SAP services the following is important:

- For the MSSQL database the db credentials are typically <sid> and master password if not explicitly changed during the installation or later.
- The entries for the mount point of the data, db (MSSQL specific, only the data can be relocated) can be related one to one to the entries in the service configuration. For the given set up:
 - Storage Type : SR
 - MountPoint (read your ntp_srid.conf file)
 - FS/SRID Type : ISCSI
 - Part ID: NTP

The screenshot shows the 'Service Configuration Summary' for a System Database (ABAP) instance. The 'Mount Points' section is highlighted with a red box, showing the following configuration:

Storage Type	Mount Point	Export Path	Options	FS/SRID Type	Partner ID	Systemwide
SR	MQLMSDATA			ISCSI	NTP	<input type="checkbox"/>

Other visible details include: Name: System Database (ABAP): MQLMS, SID: MQL, Database Name: MQL, Database Usage: ABAP, Database Type: MSS, Primary System Host: dimngl, Primary Network: WindowsNetwork, Required Memory (MB): 8, Required SAPS: 288, Preferred Resource: [empty].

- Don't forget the windows domain when entering the service registration user i.e. <DOMAIN>\SAPService<SID>.

The screenshot shows the 'Service Configuration Summary' for an AS Instance (ABAP) instance. The 'Mount Points' section is highlighted with a red box, showing the following configuration:

Storage Type	Mount Point	Export Path	Options	FS/SRID Type	Partner ID	Systemwide
SR	MQL_02			ISCSI	NTP	<input type="checkbox"/>

Other visible details include: Name: AS Instance (ABAP): 02, dimngl, SID: MQL, System Number: 02, Primary System Host: dimngl, Primary Network: WindowsNetwork, Required Memory (MB): 8, Required SAPS: 288, Preferred Resource: [empty], Registration Username: ACOVMSAPServiceMQL, Registration Password: [masked], Instance Start Profile Path: [path].

- Do the same for each instance you want to accenable.

Now you are set to manage you Windows based SAP Systems congratulations!

Open Issues

In the end I will collect in this chapter still conceptually open issues you must consider when using ACC:

- **Virgin host preparation:** When you have read that paper it should have become clear that you must prepare a new (i.e. it has never been touched before by SAPInst) computer system in your landscape in a certain way to ensure that you can relocate SAP instances or DB instances to it. E.g. install certain software, create sapmnt and saplocal, create certain user/groups locally etc. We are aware of that. But we (ACC) can not solve that, there exist tools that can help you with parts of the problem but we can not even provide best practices for all problems. Here you should consult your SAP Basis Technology consultant.
- We ACC currently do not check that the versions of the database files match with the versions of the database we try to attach the database files. So it must be ensuring in the landscape that the versions of the database software are same on all potential hosts.
- Under windows the instance representing SAPGLOBALHOST must be prepared first since the preparation process for the other instances depends on a prepared SAPGLOBALHOST. Since SAPGLOBALHOST is a Windows only concept we normally prepare all instances of a system in parallel. This leads of course with more than one SAP instance in more than 50% of relocations of the whole system to errors. We currently only have a workaround for the problem. It is described in Appendix VIII.

Appendix I: saphostctrl Command Line Interface

The host agent has a command line interface that allows the management of the instances and databases running on the given host. It is self documenting i.e. executing the command saphostctrl in the directory %HOST_AGENT_HOME%\exe>saphostctrl gives the following output given here as reference, all operations executed by the ACC have an equivalent command line command:

Usage: saphostctrl [generic option]... -function <Webmethod> [argument]...
saphostctrl -help [<Webmethod>]

Generic options:

-host <hostname>
-user <username> <password>

Supported Webmethods:

StartInstance

-sid <Sys ID> -nr <Sys Number> -saplocalhost <hostname> [-timeout <timeout in sec>] [-service] [-prehook] [-posthook]

StopInstance

-sid <Sys ID> -nr <Sys Number> -saplocalhost <hostname> [-timeout <timeout in sec>] [-service] [-cleanup] [-prehook] [-posthook]

ListInstances

[-running (list running instances only) | -stopped (list stopped instances only)]

CallServiceOperation

-op startdb|stopdb -sid <Sys ID> [-dbname <DB name>] [-dbusage Abap|Java|Doublestack|LiveCache] [-dbhost <DB hostname>] [-dbtype ada|db6|mss...] [-service] [-timeout <timeout in sec>] [-prehook] [-posthook]

ACOSPrepare

-op <operation> argument... [-op <operation> argument...]... [-timeout <timeout in sec>]

supported operations:

mount|umount|ifup|ifdown

mount/umount arguments:

-storage_type netfs|dfs|srid -fsname <file system name> -mntpoint <mount point> -storage_vendor <vendor> (only for dfs and srid) -dfstype <distributed file system type> -srid <storage resource ID> -sridtype <type> [-fsoptions <file system mount options> (only for netfs and dfs)]

ifup arguments:

-iface <interface name> -vhost <virtual hostname> [-nmask <netmask>] [-bcast <broadcast address>]

ifdown arguments:

-vhost <virtual hostname>

GetOperationResults

-id <OperationID> [-timeout <timeout in sec>]

CancelOperation

-id <OperationID> [-timeout <timeout in sec>]

ExecuteOperation

-name <Operation> [-timeout <timeout in sec>] [<key>=<argument>]

GetCIMObject

-classes <List of Class names(comma sepatated)> [-attr <List of attribute (comma sepatated)>]

GetComputerSystem

-wbem [-attr <List of attribute (comma sepatated)>]

ListDatabases**GetDatabaseStatus**

-dbname <DB name> -dbtype <ada|db6|mss...> [-dbhost <hostname>] [-dbinstance <instance name>] [-dbuser <DB admin username>] [-dbpass <DB admin password>]

StartDatabase

-dbname <DB name> -dbtype <ada|db6|mss...> [-dbhost <hostname>] [-dbinstance <instance name>] [-dbuser <DB admin username>] [-dbpass <DB admin password>] [-timeout <timeout in sec>] [-service] [-force]

StopDatabase

-dbname <DB name> -dbtype <ada|db6|mss...> [-dbhost <hostname>] [-dbinstance <instance name>] [-dbuser <DB admin username>] [-dbpass <DB admin password>] [-timeout <timeout in sec>] [-service] [-force]

AttachDatabase

-dbname <DB name> -dbtype <ada|db6|mss...> [-dbconfdir </path/to/config-dir>] [-dbhost <hostname>] [-dbinstance <instance name>] [-dbuser <DB admin username>] [-dbpass <DB admin password>] [-timeout <timeout in sec>] [-service] [-force]

DetachDatabase

-dbname <DB name> -dbtype <ada|db6|mss...> [-dbconfdir </path/to/config-dir>] [-dbhost <hostname>] [-dbinstance <instance name>] [-dbuser <DB admin username>] [-dbpass <DB admin password>] [-timeout <timeout in sec>] [-service] [-force]

GetDatabaseProperties

-dbname <DB name> -dbtype <ada|db6|mss...> [-dbhost <hostname>] [-dbinstance <instance name>] [-dbuser <DB admin username>] [-dbpass <DB admin password>]

LiveDatabaseUpdate

-dbname <DB name> -dbtype <ada|db6|mss...> [-updatemethod <Extract|Check|Prepare|Undo|Execute|Cleanup>] [-updateoption <SourcePath=/a/path>] [-updateoption <TargetPath=/a/path>]... [-dbhost <hostname>] [-dbinstance <instance name>] [-dbuser <DB admin username>] [-dbpass <DB admin password>] [-timeout <timeout in sec>]

RegisterInstanceService

-sid <Sys ID> -nr <Sys Number> -saplocalhost <hostname> [-profile <path to start profile>] [-srvuser <username> -srypass <password> (Windows only)] [-timeout <timeout in sec>]

UnregisterInstanceService

-sid <Sys ID> -nr <Sys Number> -saplocalhost <hostname> [-timeout <timeout in sec>]

ExecuteInstallationProcedure

-src <Source directory of the SAPInst executable> -prodid <Product ID> -inifile <SAPInst ini file> [-timeout <timeout in sec>]

[-cleanup <auto|delayNR> remove all temporary created directories, eventually umount the mounted filesystem]

[-retry <retry a precedentely failed execution. -home and -src are mandatory>]

[-mountsrc <The source mount directoy>]

[-mounttgt <The local mount directoy. If the directory doesn't exists will be created>]

[-mounttype <currently only net is supported, could be omitted>]

[-mountopt <Additionally option to be passed to mount: e.g: '-o exec,ro'>]
[-mountusr <The user which will be used to mount the filesystem>]
[-mountpwd <The password of the user used by -mountusr>]
[-umount <umount the mounted filesystem mounted by -mountsrc on -mounttgt>]
[-umountopt <Additionally option to be passed to umount>]
[-home <The home directory, where the whole process will be executed>]
[-trace <SAPInst trace value.>]

The host agent itself uses three further helpers to execute its commands they are described by their command line interfaces in the following appendices.

Appendix II: sapcontrol Command Line Interface

For managing SAP instances by hand i.e. via command line you use the sapcontrol command. It is fully self documented i.e. by entering the command sapcontrol in the directory of the host agent you get the following output:

```
usage: sapcontrol [
    -prot GSOAP_HTTP| http using gsoap build in sockets (default)
        NI_HTTP|  http using SAP NI sockets (prefer Unix domain sockets)
        NI_HTTPS| https using SAP NI sockets (prefer Unix domain sockets)
        WINHTTP|  http using Windows winhttp
        WINHTTPS| https using Windows winhttp
        PIPE     Windows named pipes
    ]
[-trace <filename>]    Trace SOAP request/response
[-user <user> <password>] OS user and password for Webservice authentication
[-repeat <N> <D>]     Repeat Webmethod call <N> times (-1=forever) with <D> sec delay
[
    -format list|      List output format (default)
        script        Script output format
    ]
    [-host <hostname>]  Host to connect to (default: localhost)
    -nr <instance nr.>  SAP Instance number to connect to
    -function <Webmethod> [parameter list]
```

Webmethods: Start

```
    Stop [softtimeout sec]
Shutdown
    RestartInstance [softtimeout sec]
StopService
StartService <SID>
RestartService
ParameterValue [<parameter>]
    GetStartProfile
GetTraceFile
GetAlertTree
GetAlerts
GetEnvironment
GetVersionInfo
GetQueueStatistic
GetProcessList
GetInstanceProperties
ListDeveloperTraces
ReadDeveloperTrace <filename> <filesize>
ListLogFiles
ReadLogFile <filename> [<filter> [<language> [<maxentries> [<cookie>]]]]
AnalyseLogFiles [<severity 0-2>] [<maxentries>] [<starttime YYYY MM DD HH:MM:SS> <endtime YYYY
MM DD HH:MM:SS>]
GetAccessPointList
GetProcessParameter <processtype> [pid]
SetProcessParameter <processtype> <pid> <parameter> <value1> [<value2> ... <valueN>]
OSExecute <command> <async> <timeout> <protocolfile>

SendSignal <pid> <signal>
```

GetSystemInstanceList

StartSystem [ALL|SCS|DIALOG|ABAP|J2EE|TREX|ENQREP|LEVEL <level> [<waittimeout sec>]]

StopSystem [ALL|SCS|DIALOG|ABAP|J2EE|TREX|ENQREP|LEVEL <level> [[<waittimeout sec>]
[softtimeout sec]]]

RestartSystem [ALL|SCS|DIALOG|ABAP|J2EE|TREX|ENQREP|LEVEL <level> [[<waittimeout sec>]
[softtimeout sec]]]

AccessCheck <function>

GetSecNetworkId <service_ip> <service_port> [<version> [<challenge>]]

GetNetworkId <service_ip> <service_port> [<version>]

ABAPReadSyslog

ABAPReadRawSyslog

ABAPGetWPTable

J2EEControlProcess <processname> <function>

J2EEEnableDbgSession <client> [<processname> <debugflags>]

J2EEDisableDbgSession <debugkey>

J2EEGetProcessList

J2EEGetProcessList2

J2EEGetThreadList

J2EEGetThreadList2

J2EEGetThreadCallStack [<threadindex>]

J2EEGetThreadTaskStack [<threadindex>]

J2EEGetSessionList

J2EEGetCacheStatistic

J2EEGetCacheStatistic2

J2EEGetApplicationAliasList

J2EEGetComponentList

J2EEGetWebSessionList

J2EEGetEJBSessionList

J2EEGetRemoteObjectList

J2EEGetVMGCHistory

J2EEGetVMGCHistory2

J2EEGetVMHeapInfo

J2EEGetClusterMsgList

J2EEGetSharedTableInfo

ICMGetThreadList

ICMGetConnectionList

ICMGetProxyConnectionList

ICMGetCacheEntries

EnqGetStatistic

EnqGetLockTable

StartWait <timeout sec> <delay sec>

StopWait <timeout sec> <delay sec>

WaitforStarted <timeout sec> <delay sec>

WaitforStopped <timeout sec> <delay sec>

RestartServiceWait <timeout sec> <delay sec>

CheckHostAgent

Exitcode: 0: Last Webmethod call successfull

1: Last Webmethod call failed, invalid parameter

2: StartWait, StopWait, WaitforStarted, WaitforStopped, RestartServiceWait timed out

3: GetProcessList succeeded, all processes running correctly

4: GetProcessList succeeded, all processes stopped

Security: Trusted connects without user and password check are possible through

Unix domain socket or Windows named pipes. Protected webmethods like Start or Stop require a trusted connection or OS user and password authentication.

Appendix III: sapacosprep Command Line Interface

For mounting/unmounting of storage devices and binding/unbinding of IP addresses the host agent uses the sapacosprep command utility. That utility provides a generic interface to mount/unmount storage devices independent from the storage provider and a similar generic interface to bind/unbind IP addresses independent from the OS. As all adaptive command line tools it is self documented so the command sapacosprep entered on the command line in the host agent directory gives the following output:

SAPACOSPREP USAGE

```
sapacosprep -a COMMAND [COMMAND ARGUMENT]... [COMMAND OPTION]... [GENERIC OPTION]...
```

COMMANDS

ifup: activates a virtual IP address

```
-a ifup -i <network interface> -h <hostname|IP address>
[-n <netmask address>] [-b <broadcast address>]
```

ifdown: deactivates a virtual IP address

```
-a ifdown -h <hostname|IP address>
```

mount: mounts a network file system

```
-a mount -f <export path> -m <mount point> [-o mount options]
```

umount: unmounts a network file system

```
-a umount -f <export path> -m <mount point>
```

mountDFS: mounts a distributed file system

```
-a mountDFS -f <export path> -m <mount point> -t <file system type>
-p <partner ID> [-o <mount options>]
```

umountDFS: unmounts a distributed file system

```
-a umountDFS -f <export path> -m <mount point> -t <file system type>
-p <partner ID>
```

mountSR: mounts a storage resource

```
-a mountSR -m <srid> -t <srid type> -p <partner ID>
```

umountSR: unmounts a storage resource

```
-a umountSR -m <srid> -t <srid type> -p <partner ID>
```

diag: The diag command tries to load every partner library

located in the sapacosprep directory and prints out the module information.

-a diag

MOUNT OPTIONS

-C

Create mount point directory

UMOUNT OPTIONS

-D

Delete mount point directory

GENERIC OPTIONS

-H

displays this help text

-V

displays version information

-x

Output not XML encoded (deprecated)

-R

Do not perform an effective user check (for testing purposes only)

-v <number>

Specifies the protocol version (deprecated)

-P

Print output in a format that can easily be parsed

-L <directory>

Colon-separated list of directories to search for libraries

-T <filename>

Specifies the log and trace file. Per default it will be tried to

create a file named sapacosprep.log in one of the following directories:

\usr\sap\tmp, \path\to\sapacosprep, .\

EXAMPLES

run diagnostics


```
sapacosprep -a diag
```

```
# activate virtual IP address
```

```
sapacosprep -a ifup -i eth0 -h cic11
```

```
# mount network file system
```

```
sapacosprep -a mount -f host:/sapmnt/C11 -m /sapmnt/C11
```

Appendix IV: sapdbctrl Command Line Interface

To manage the database instances the host agent uses the sapdbctrl command. The command is self documented, if you execute sapdbctrl in the directory %HOST_AGENT_HOME%\exe you the following output: **You must execute these commands as a local administrator**, this especially important under Windows! :

Usage: sapdbctrl <command> <DB name> [options]...

sapdbctrl setproperty <DB name> <name> <value> [options]...

sapdbctrl list [options]...

sapdbctrl menu (deprecated)

Commands:

start	Start database
stop	Stop database
status	Show database status
attach	Attach database files / register database instance
detach	Detach database files / de-register database instance
getproperties	List all DB properties
setproperty	Set DB property
list	List instances and databases
liveupdate	Database online update
menu	Show menu

Live update options:

- m method name, one of Check|Prepare|Undo|Execute|Cleanup
(default: Check)
- o method option (e.g. SourcePath=<path>), this flag can be used
more than once to specify multiple options.

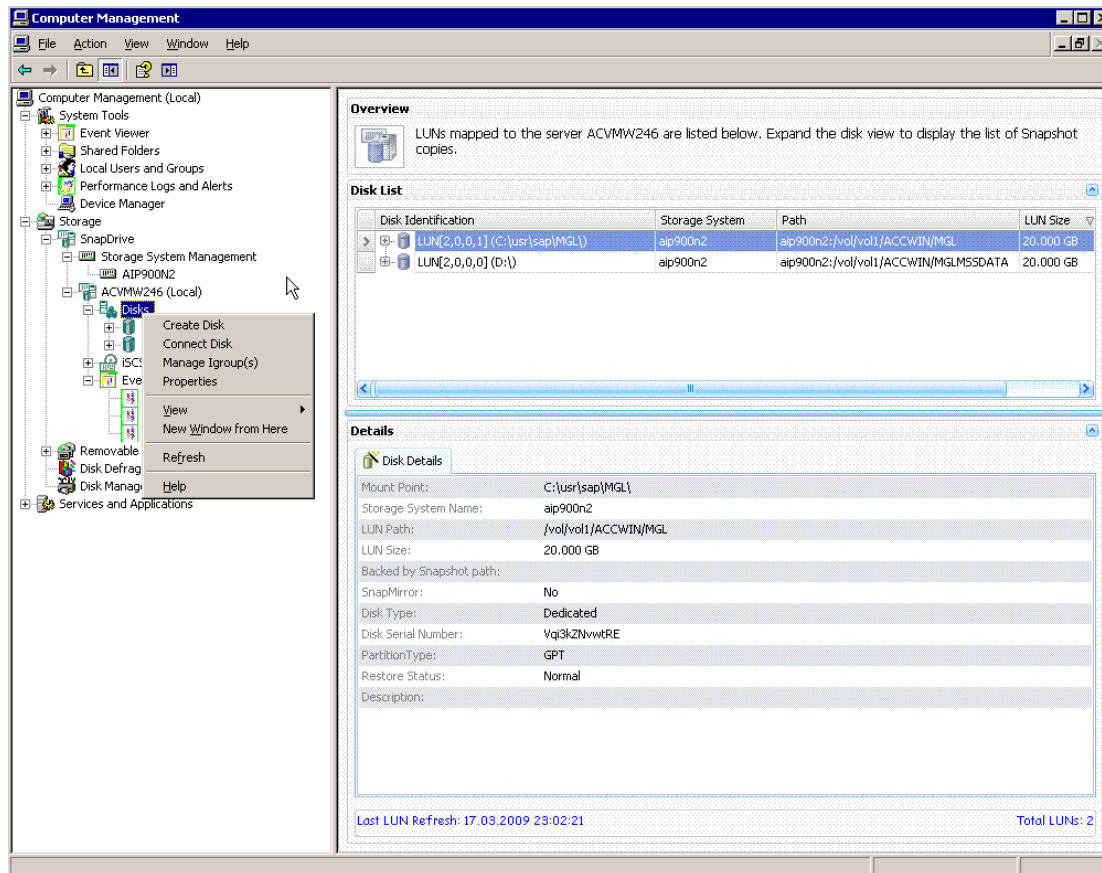
Generic options:

- h This help text
- i specify DB instance name (default: DB name)

- H specify hostname (default: local hostname)
- t specify DB type (default: sap)
- u specify DB admin username
- p specify DB admin password or '-' to read password from stdin
- c specify path to configuration directory
- F force start/stop
- I start/stop/attach/detach without instance
- N start/stop/attach/detach with network service
- w specify timeout for soft-shutdown in seconds (default: 30 sec)
- P print output in a format that can easily be parsed
- T specify trace level (0...3, default: 1)

Appendix V Creating LUNS with NetApp SnapDrive

Before you can start with the installation of an adaptive enabled SAP system you must create the necessary storage space i.e. LUNs on the storage system and mount them on the installation host. NetApp Provides software called "SnapDrive for Windows" that comes as a MMC "plugin" and allows the management of LUNs on a storage system in the background. As shown in the screen shot you can create new LUNs on the filer with that tool. During the wizard guide creation process of the LUNS you are asked for the mount points and the path on the filer (see the steps below). With regard to the last it's up to you how to manage your filer, with regard to first please follow the advice given in the text.



After you created the LUNs don't forget to enter the relevant data in all your ntp_srid.conf files as given in the example ntp_srid.conf file below. These files have to be placed together with the NetApp sapacosprep lib libsapacosprep_ntp.exp/dll's in the %HOST_AGENT_HOME%\EXE dir if you want to execute the sapacosprep command in that directory, ***for the ACC it must be placed in the %HOST_AGENT_HOME%\work dir i.e the default host agent work directory or generally the work dir as defined by the host agent.***

```
# $Id: //depot/prod/boathook/main/doc/ntp_srid.conf.example.skel#5 $
# ntp_srid.conf "NTAPsac version N20090212_1239"
#
# Copyright (c) 2005 Network Appliance, Inc.
# All rights reserved.
#
# Storage Resource Configuration File.
```

```
#  
  
# The format of this file is:  
  
#####  
  
# VERSION=2  
  
#  
  
# SRIDfiler:lun RAW mountpoint  
# SRIDfiler:lun LVM mountpoint volume_group_name/logical_volume_name  
# ...  
  
#####  
  
#  
  
# The VERSION line is required.  
  
#  
  
# RAW indicates an EXT3 filesystem on an unpartitioned disk.  
  
#  
  
# LVM indicates an EXT3 filesystem on a Logical Volume Manager logical volume.  
# LVM requires two additional parameters, the LVM volume group name and the  
# logical volume name.  
  
  
#  
  
# Here are some examples.  
  
#  
  
VERSION=2  
  
license=<YOUR LICENSE KEY>  
  
#  
  
# Hello world MGL exampel  
  
#  
  
MGL aip900n2:/vol/vol1/ACCWIN/MGL NTFS c:\usr\sap\MGL\  
  
#MGLDATA aip900n2:/vol/vol1/ACCWIN/MGLDATA NTFS c:\MSSQL\MGL\  
  
#
```

#Didn't work due to SAPInst Bug

MGLMSSDATA aip900n2:/vol/vol1/ACCWIN/MGLMSSDATA NTFS D:

#MI1 weever:/vol/saplogs_MI1/logs_mirrA RAW /oracle/MI1/mirrlogA

#MI1 weever:/vol/saplogs_MI1/logs_mirrB RAW /oracle/MI1/mirrlogB

#MI1 weever:/vol/sapdata_MI1/data RAW /oracle/MI1/data

#

Development DB

#

#MI2 tang:/vol/saplogs_MI2/logs_origA LVM /oracle/MI1/origlogA origA_vg/origa_lv

#MI2 tang:/vol/saplogs_MI2/logs_origB LVM /oracle/MI1/origlogB origB_vg/origa_lv

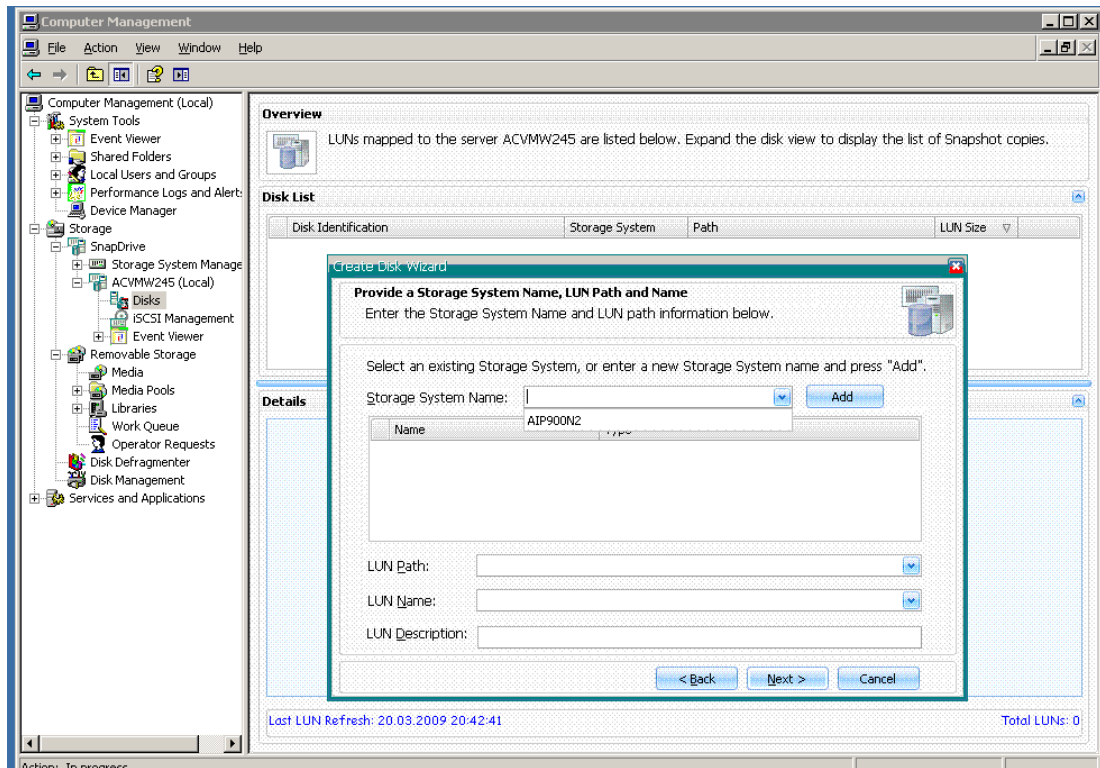
#MI2 tang:/vol/saplogs_MI2/logs_mirrA LVM /oracle/MI1/mirrlogA mirrA_vg/origa_lv

#MI2 tang:/vol/saplogs_MI2/logs_mirrB LVM /oracle/MI1/mirrlogB mirrB_vg/origa_lv

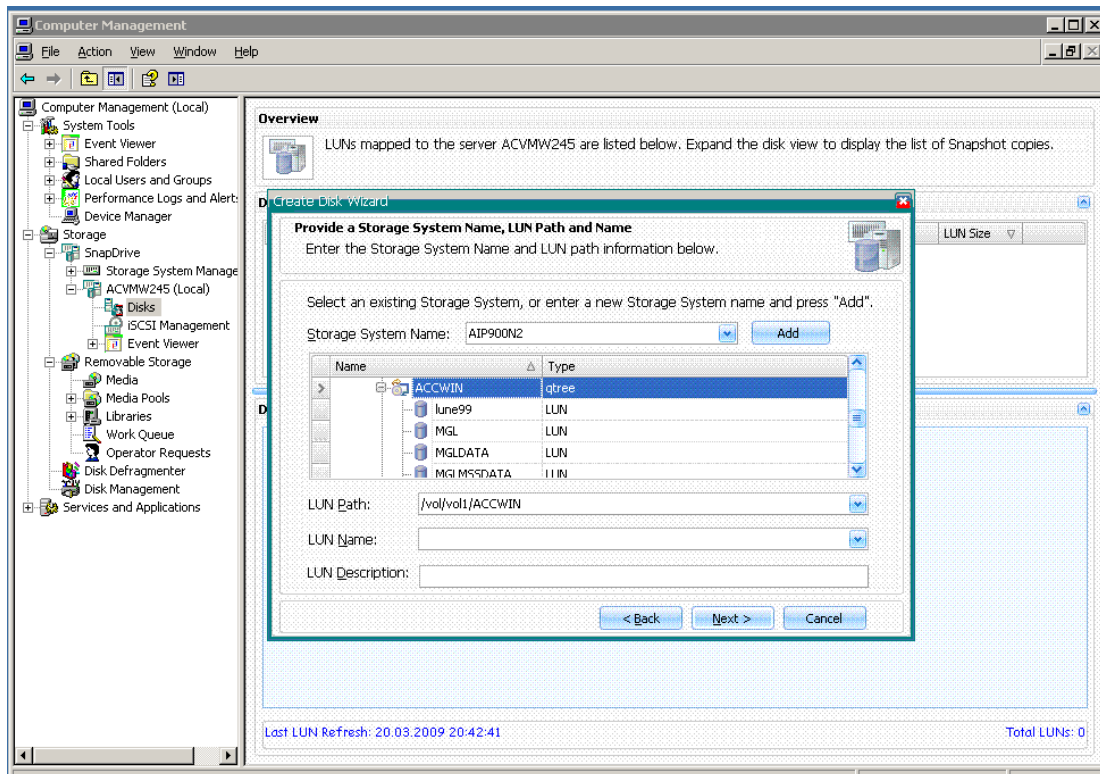
#MI2 tang:/vol/sapdata_MI2/data LVM /oracle/MI1/data data_vg/data_lv

Wizard steps

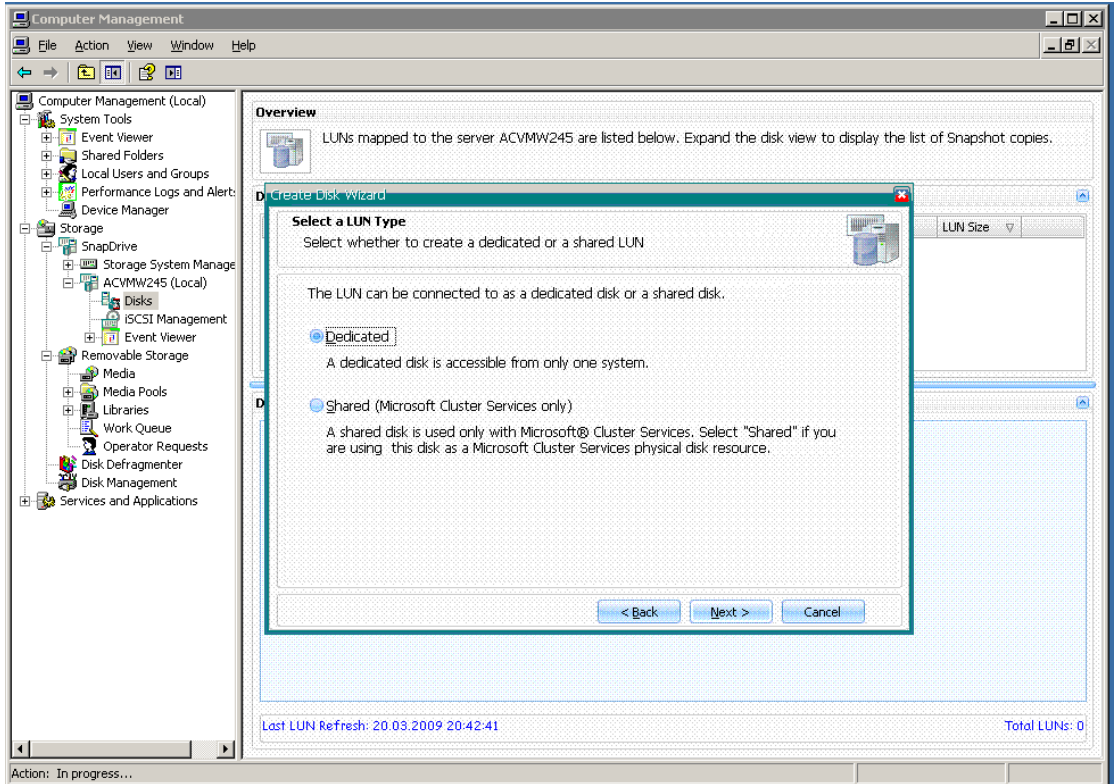
When creating the three Luns for the three instances NetApp SnapDrive provides you a wizard to do that. Below we show you the wizard steps that you know which information you must provide and remember.



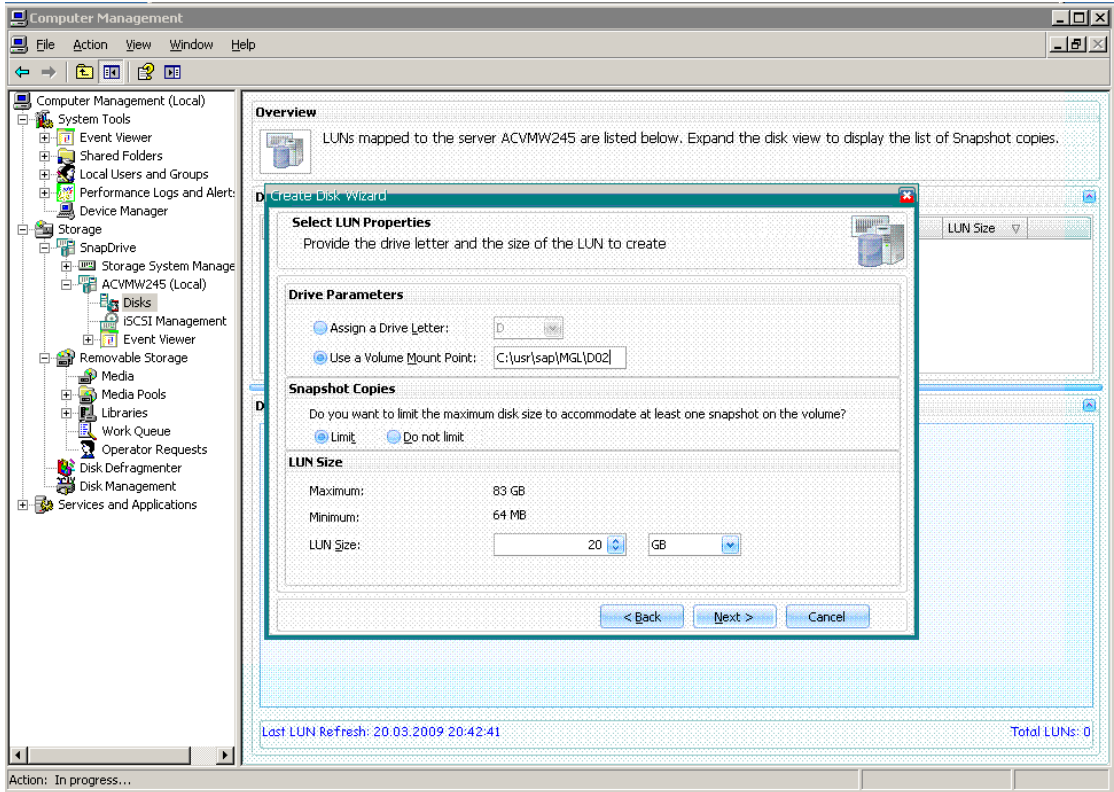
Step one: Select the storage system.



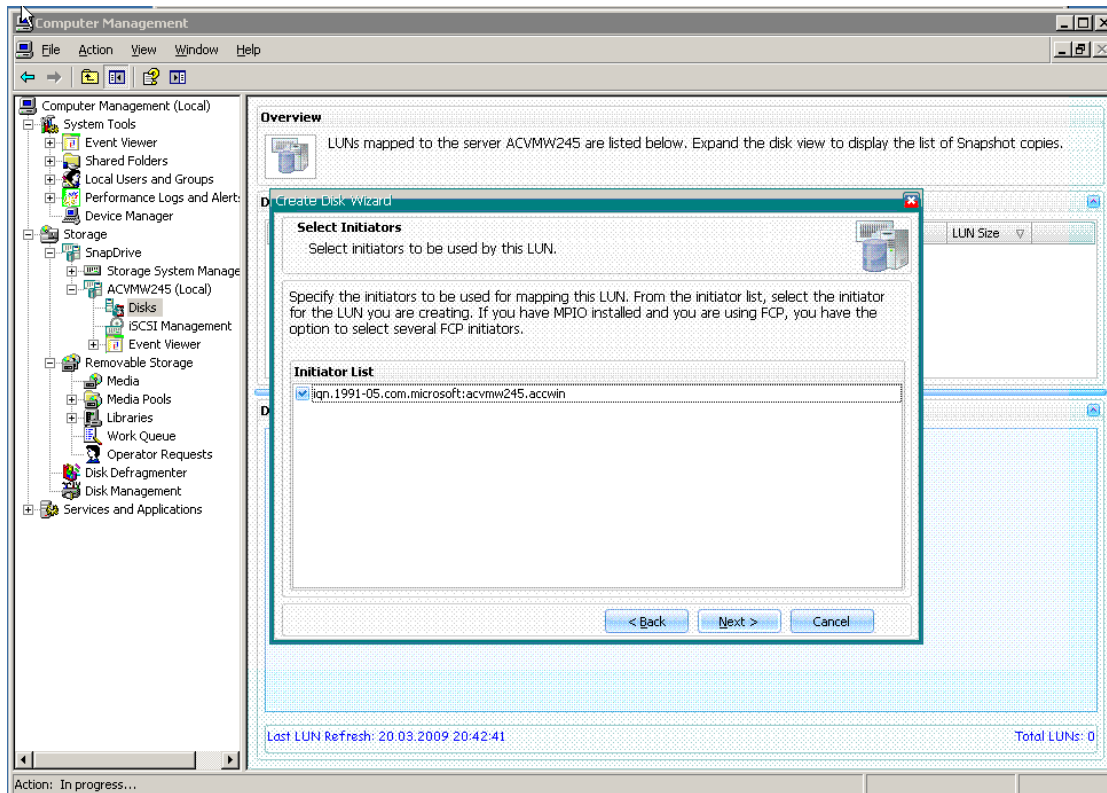
Step two: remember the full path of the lun.



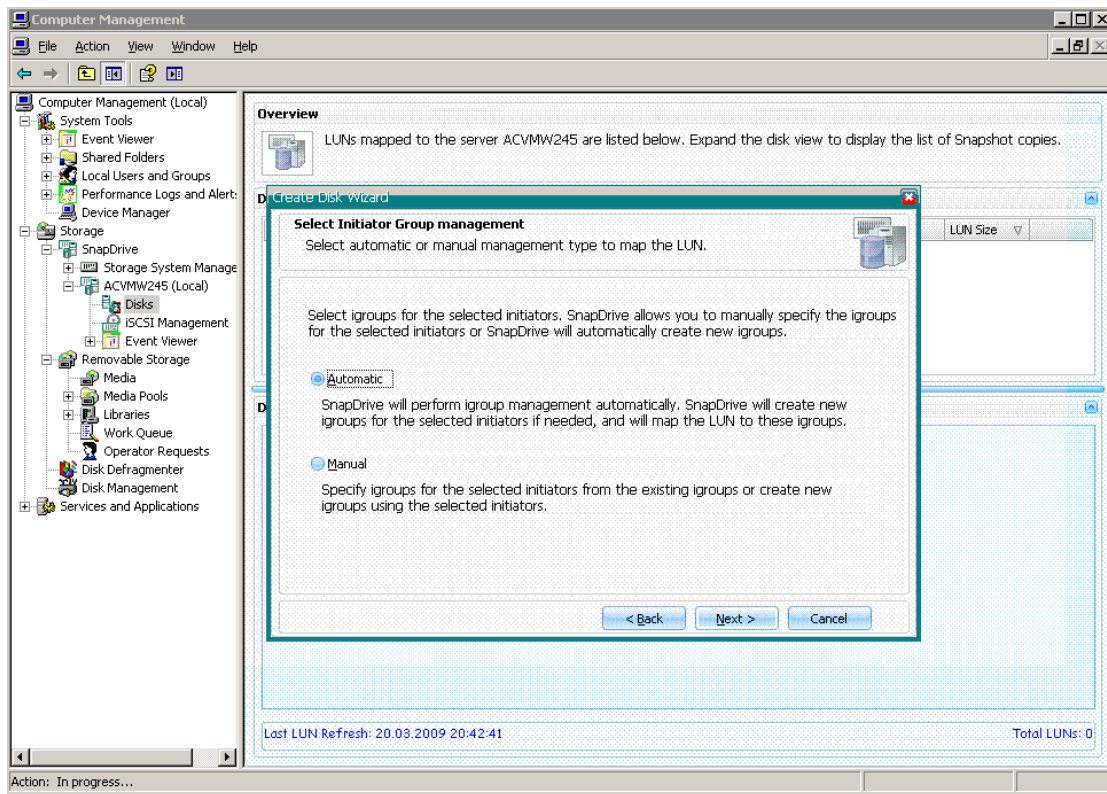
Step three:



Step four: Rember the mount point for later



Step five:



Step six:

Appendix VI: Relevance of SAP Resources during the Relocation Process

The sap installation creates quite some resources i.e. files and folders on the host were it is executed. With regard to adaptive computing the general question arises which folders are relevant for a system for a instance for a database and must be relocate together with the system instance and data base. In that appendix we try to give an answer to that question.

- C:\usr\sap\PRFLOG: Belongs to the saposcol remains local.

•

Appendix VII: System MGL

The demo system MGL used in the paper shown in the ACC:

The screenshot displays the SAP Service Overview and Service Details for the MGL AS Instance (ABAP): 02, dimgl. The Service Overview table lists the following services:

Service	System	Pool	Description	Operation	Assigned Resource	Virtualized
WindowsPool (1)						
MGL: WebAS ABAP, dbmgl (3)		WindowsPool				
MGL System Database (ABAP): MS SQL, dbmgl	MGL: dbmgl	WindowsPool			@cvmw246	<input type="checkbox"/>
MGL Central Instance (ABAP): 00, scsmgl	MGL: dbmgl	WindowsPool			@cvmw246	<input type="checkbox"/>
MGL AS Instance (ABAP): 02, dimgl	MGL: dbmgl	WindowsPool			@cvmw245	<input type="checkbox"/>

The Service Details section for MGL AS Instance (ABAP): 02, dimgl shows the following information:

- Service: MGL AS Instance (ABAP): 02, dimgl
- Service ID: SystemID.MGL.Number.02.InstanceHost.dimgl
- System: MGL: WebAS ABAP, dbmgl
- Service Group: Business Area
- Service Status: Running
- Service Locked:
- Operation: Description:

Requirements and Selected Resource information:

- AC Enabled:
- AC Operational:
- Required Memory (MB): 0
- Required SAPS: 0
- Operating System: Windows NT
- Operating System Version: Windows 2003
- CPU Type: X86_64
- Address Space: 64
- Selected Resource Hostname: @cvmw245
- Preferred Resource: Set
- Available Memory (MB): 2,058
- Available SAPS: 600

Activity Steps for this Service:

Operation	Resource	Activity Step Status
No Activity Steps scheduled		

Service Status Monitoring:

Processes:	Type	Monitoring Status
disp+work.EXE	Dispatcher	SAPControl-GREEN Running, Message Server connection ok, Dialog Queue time: 0.00 sec
igswwd.EXE	IGS Watchdog	SAPControl-GREEN Running

Additional controls include: Refresh Monitoring Data, Validate Service Configuration, Test Host Agent Connection, Timeout [sec]: 10, Host Agent Port: 1.128, Use Https, and Start Instance Agent.

Status One: DB and central services are running on acvmw246 dialog instance runs on acvmw245

Services Overview - Selected: [WindowsPool - MGL AS Instance (ABAP): 02, dimgl]

Group by: Hierarchy (default) | Filter: <Select> | Auto Refresh (s): 20 | On | Export | Refresh

Service	System	Pool	Description	Operation	Assigned Resource	Virtualized
WindowsPool (1)						
<ul style="list-style-type: none"> MGL WebAS ABAP, dimgl (3) <ul style="list-style-type: none"> MGL System Database (ABAP): MS SQL, dimgl MGL: dimgl WindowsPool acvmw245 MGL Central Instance (ABAP): 00, scsmgl MGL: dimgl WindowsPool acvmw245 MGL AS Instance (ABAP): 02, dimgl MGL: dimgl WindowsPool acvmw246 						

Service Details | Log

Prepare & Start | Stop & Unprepare | Relocate (Running) | Forced | Resource Check: Enabled | Notes: Disabled | Open SAP MC | Show in Logs | Show in Config

Service: MGL AS Instance (ABAP): 02, dimgl | Service Status: ■ Running
 Service ID: SystemID.MGL.Number.02.InstanceHost.dimgl | Service Locked:
 System: MGL: WebAS ABAP, dimgl | Operation:
 Service Group: | Description:
 Business Area:

Requirements

AC Enabled: | AC Operational:
 Required Memory (MB): 0 | Required SAPS: 200

Selected Resource

Hostname: acvmw246 | Preferred Resource: | Available Memory (MB): 2,750 | Available SAPS: 400

Operating System	Operating System Version	CPU Type	Address Space
Windows NT	Windows 2003	X86_64	64

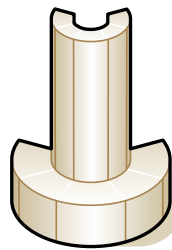
Activity Steps for this Service

Operation	Resource	Activity Step Status
No Activity Steps scheduled		

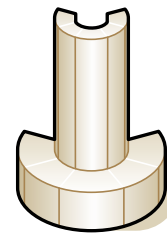
Service Status Monitoring

Processes	Type	Monitoring Status
disp+work.EXE	Dispatcher	SAPControl-GREEN: Running, Message Server connection ok, Dialog Queue time: 0.00 sec
igswwd.EXE	IGS Watchdog	SAPControl-GREEN: Running

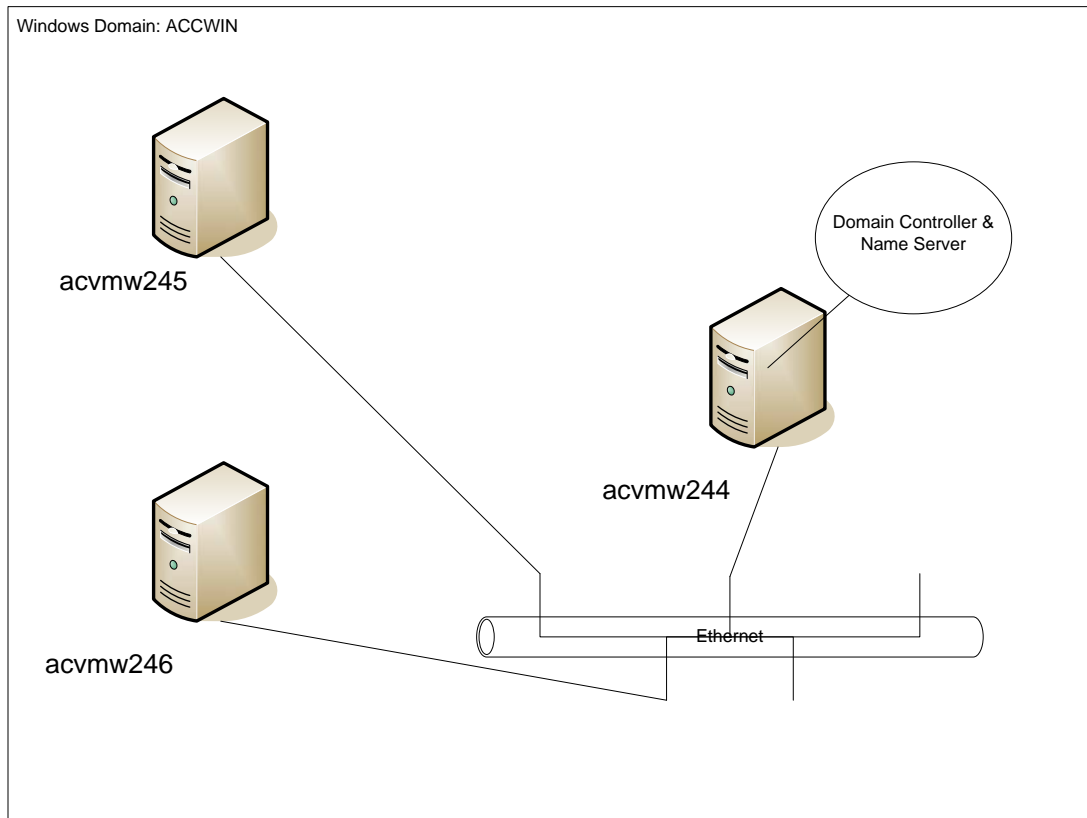
Status Two after relocating, DB and central services are running on acvmw245 dialog instance runs on acvmw246



ESX Server



Storagesystem



Appendix VIII Avoiding "SAPGLOBALHOST first" Problem During Preparation

Under windows the instance representing SAPGLOBALHOST must be prepared first since the preparation process for the other instances depends on a prepared SAPGLOBALHOST. Since SAPGLOBALHOST is a Windows only concept we normally prepare all instances of a system in parallel. This leads of course with more than one SAP instance in more than 50% of relocations of the whole system to errors.

Since the problem occurs only in the preparation phase during the registration of the sap instance agent. Normal the host agent needs the CIFS share of the SAPGLOBALHOST to provide it to the self registration call to the instance agent. If the share is not up the registration fails. The workaround is to place the profile folder for the system on a share of a "profile host" that is always accessible. In the following we describe the necessary steps in detail.

1. Stop all sap instances on all resources as described in [Stop SAP instances by hand on host A](#) deregister all sap instances on all resources as described in [unregister SAP instance agents by hand on host A](#).
2. Copy the folders <SID>\SYS\profile and <SID>\SYS\global to e.g. \\<profilehost>\sapmnt\MGL\SYS\profile, \\<profilehost>\sapmnt\MGL\SYS\global. You may rename or delete the corresponding folders on the SAPGLOBALHOST host to avoid double maintenance of the profiles.
3. Ensure that the SAPService<SID> user has full control of the share and <SID>adm as well as sapadm user have read access.
4. Empty the folder \\<profilehost>\sapmnt\MGL\SYS\global\sapcontrol if it is not empty.
5. Maintain the following profile parameters in all instance profiles:

DIR_GLOBAL = \\<profilehost>\sapmnt\MGL\SYS\global

DIR_PROFILE = \\<profilehost>\sapmnt\MGL\SYS\profile
6. Register the instance agent again on the host were it was registered before as described in [register SAP instance agents by hand on host B](#). Of course use the correct path to the profile host for the profile path.
7. Check that `sapcontrol -nr XX -function GetSystemInstanceList` returns correctly all SAP instances.
8. If you have already configured the system in the ACC adjust the instance profile path for each instance.
9. Start the instances again as described in [start SAP instances by hand on host B](#) or use the ACC if you have already configured the system in the ACC.

References

<http://service.sap.com/instguides> for your SAP system in particular the planning and the technical installation guides are important.

[Creating roaming user profiles](#)

[Configuring roaming user profiles](#)

[Configuring systems and resources in the ACC](#)

[Microsoft iSCSI Initiator](#)

[NetApp Snapdrive for Windows](#)

For more information, visit the [Landscape Design and Architecture homepage](#).

SAP NOTES for Windows as an OS for Managed SYSTEMS

[Note 360515 TCP IP Alias host names in UNC path in Windows 2000 2003](#)

[Note 1282975 Use of virtual TCPIP host names in Windows](#)

[Note 908533 Prerequisites in an Windows Adaptive Computing \(TODO: ACC 1.0 needs an update!\)](#)

SAP NOTES for MSSQL

[Note 896566 SQL4SAP and SAP Installation Media for SQL Server](#)

[Note 985137 Service Pack Installation for SQL Server 2005](#)

[Note 62988 Support Packages for Microsoft SQL Server](#)

[Using SQL Server 2005 with SAP R/3](#)

[DBCC CHECKDB](#)

[Note 555223 FAQ: Microsoft SQL Server](#)

[Note 363018 Dateimangement für SQL Server](#)

SAP NOTES with Relation to ACC Relevant Network Topics

[Note 962955 Use of virtual TCPIP host names](#)

[Note 611361 Hostnames of SAP servers](#)

[Note 129997 Hostname and IP address lookup](#)

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