



Landscape - Automized Setup of SAPHanaSR-scaleOut - Version 3.2.2

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1 Scope of this document

This guide describes the procedure to install a SAP HANA Scale-Out workload with system replication using the Landscape package.

Before you use this guide you should be working with the GetStarted guide which explains the terms and leads you through a simple session.

2 Phase I - Install Landscape Software and Configure your Environment

2.1 Installing a LandscapeMaster

- The LandscapeMaster must be installed with SLES for SAP 12 SP1 or newer.
- Install `nfs-server`, enable the service and export at least `/var/lib/Landscape`. `/var/lib/Landscape` should only be available for read-access without `root-squash`. Restart the NFS server or re-export the file systems.
- The LandscapeMaster needs enough disk space for `/var/lib/Landscape`. The exact amount of space depends on the number of SAP and SUSE media stored on this share to provide them to the target systems.
- The LandscapeMaster could additionally have the role LandscapeHypervisor.
- For SAP HANA SR Scale-Out you also need a NFS share per SR replication site. This share could either be provided by the LandscapeMaster or the LandscapeHypervisors. The share should reflect the SAP SID and Site Name like `/data/nfs-scale-out/HA1/ROT1` and `/data/nfs-scale-out/HA1/WDF1`. The share should be read-writable for the VMs and should be a NFSv4 share to allow improved file locking.
- Additionally install the package Landscape on this system (see next section).

2.2 Install the Landscape software on the Landscape Master

The following command installs version 3.2.0 with build number 2.1. If you have a newer package you need to adapt the version and build number.

```
rpm -ivh Landscape-3.2.0-2.1.noarch.rpm
```

2.3 Adapt the Environment file

The next step is to adapt the environment definition file. In the example we use `/etc/Landscape.d/SetupLandscape.Hana.env`.

The name scheme for the landscape environment file is **SetupLandscape.<Environment-Name>.env**.

Copy the file to an own name such like `/etc/Landscape.d/SetupLandscape.MySweetHome.env`.

```
cd /etc/Landscape.d
cp SetupLandscape.Hana.env SetupLandscape.MySweetHome.env
```

EXAMPLE 1: FILE /ETC/LANDSCAPE.D/SETUPLANDSCAPE.HANA.ENV

```
#
# Landscape_Environment Hana
#
# LandscapeHypervisors
#
LandscapeHypervisors=("hana-01" "hana-02")
#
LandscapeSMTFingerPrint="6C:83:B5:13:45:66:48:CB:08:D8:3A:92:E2:B5:45:CB:84:F5:9F:FD"
LandscapeSMTServer="infra.tam-lab.suse.de"
#
#
LandscapeSAPMedia="$LandscapeRoot/media/SAP-MEDIA"
LandscapeNFSSERVER="192.168.201.40"
#
LandscapeNetworks=(
"name=userlan      type=br      br=br0      forward=bridge"
"name=clusterlan   type=virbr   virbr=virbr0 ip=192.168.110.1 mask=255.255.255.0"
"name=traininglan   type=virbr   virbr=virbr1 ip=192.168.152.1 mask=255.255.255.0"
"name=traininglan2  type=virbr   virbr=virbr2 ip=192.168.150.1 mask=255.255.255.0"
)
```

Adapt all variables to match your environment.

- **LandscapeHypervisors:** A list of hypervisor names used in the environment. You need to define at least one hypervisor. All hypervisors must be accessible password-free from the Landscape Master to allow automatic setup of VMs and more.
- **LandscapeSMTServer:** The name of your SMT server available in your environment.
- **LandscapeSMTFingerPrint:** The finger print of the SMT server certificate.
- **LandscapeSAPMedia:** The path where to find SAP specific media.
- **LandscapeNFSSERVER:** The IP address of the NFS server sharing the LandscapeRoot
- **LandscapeNetworks:** A list of hypervisor networks to be used or configured in your environment. Each line defines a network. Each network needs to be defined by a name (which results in the same name as network name in virsh) and a network type (br, vir-br or virbr-dhcp). Depending on the network type you need to specify more parameters. The network type must match one of the XML templates in /usr/share/Landscape/LandscapeCore/kvm.

To allow communication between VMs on different hypervisors we recommend to have at least one network of type br which could implement a stretched layer2 network for all VMs on all hypervisors. Of course this means you first need to setup br devices (here br0) on all hypervisors. You yast to configure br-devices.

2.4 Adapt the UseCase file

The next step is to adapt the use case definition file. In the example we use /etc/Landscape.d/SetupLandscape.SRScaleOut.usc.

The name scheme for the landscape environment file is **SetupLandscape.<Use-Case-Name>.usc**.

Copy the file to an own name such like /etc/Landscape.d/SetupLandscape.MyScaleOut.usc.

```
cd /etc/Landscape.d
cp SetupLandscape.SRScaleOut.usc SetupLandscape.MyScaleOut.usc
```

EXAMPLE 2: FILE /ETC/LANDSCAPE.D/SETUPLANDSCAPE.SRSCALEOUT.ENV

```
#
# Landscape_UseCase 'SRScaleOut'
#
#
```

```

LandscapeNETMASK="255.255.255.0"
LandscapeGATEWAY="192.168.201.40"
LandscapeSAPMedia="$LandscapeRoot/media/SAP-media"
LandscapeSAPHANAinstDir="$LandscapeSAPMedia/SAPHANA-SPS12_rev120/51050846/DATA_UNITS/
HDB_SERVER_LINUX_X86_64"
# LandscapeSAPHANAinstDir="$LandscapeSAPMedia/SAPHANA-2.0-SPS00_rev200/51051635/
DATA_UNITS/HDB_SERVER_LINUX_X86_64"
# LandscapeSAPHANAinstDir="$LandscapeSAPMedia/HANA_EXPRESS_2016_10/HANA_10_DEE/
DATA_UNITS/HDB_SERVER_LINUX_X86_64"
LandscapeAYInFile="suseScaleOut-template-sle12-ay.xml"
LandscapeKVMInFile="suseScaleOut-template-kvm.xml"
LandscapeSUSE_MEDIA="SLE-12-SP2-SAP-x86_64-GM-DVD1.iso"
LandscapeDOMAIN="tam-lab.suse.de"
LandscapeSLES="SLES12"
LandscapeMemory="24" # counts in GB # TODO: definition should be possible per system also
#
# system list
#
LandscapeSystems=(
"hyp=${LandscapeHypervisors[1]} system=suse00 owner=S0 if=eth0 ip=192.168.201.100"
"hyp=${LandscapeHypervisors[0]} system=suse01 owner=S0 if=eth0 ip=192.168.201.101"
"hyp=${LandscapeHypervisors[1]} system=suse02 owner=S0 if=eth0 ip=192.168.201.102"
"hyp=${LandscapeHypervisors[0]} system=suse03 owner=S0 if=eth0 ip=192.168.201.103"
"hyp=${LandscapeHypervisors[1]} system=suse04 owner=S0 if=eth0 ip=192.168.201.104"
"hyp=${LandscapeHypervisors[0]} system=suse05 owner=S0 if=eth0 ip=192.168.201.105"
"hyp=${LandscapeHypervisors[1]} system=suse06 owner=S0 if=eth0 ip=192.168.201.106"
)
#
# interface definition for the systems
# system if=network-interface-name switch=network-name ip=ip-address mac=mac-address
#
LandscapeInterfaces=(
"system=suse00 switch=clusterlan if=eth1 ip=192.168.10.10"
"system=suse01 switch=clusterlan if=eth1 ip=192.168.10.11"
"system=suse02 switch=clusterlan if=eth1 ip=192.168.10.12"
"system=suse03 switch=clusterlan if=eth1 ip=192.168.10.13"
"system=suse04 switch=clusterlan if=eth1 ip=192.168.10.14"
"system=suse05 switch=clusterlan if=eth1 ip=192.168.10.15"
"system=suse06 switch=clusterlan if=eth1 ip=192.168.10.16"
)
#
#
#
LandscapeDisks=(
"usage=vm name=system type=qcow2 size=50G"
"usage=owner name=sbd type=raw size=1G"
)

```

```

LandscapeSAPHanaSR=(
"owner=S0 sid=HA1 inst=10 ip=192.168.201.109 rmode=sync omode=logreplay
dbtype=multiple_containers name_site1=WDF1 name_site2=R0T1 sys_site1=suse01
sys_site2=suse02"
)

LandscapeSAPHanaS0=(
"owner=S0 site=WDF1 system=suse03 mrole=master irole=worker"
"owner=S0 site=WDF1 system=suse05 mrole=master irole=standby"
"owner=S0 site=R0T1 system=suse04 mrole=master irole=worker"
"owner=S0 site=R0T1 system=suse06 mrole=master irole=standby"
)

```

Adapt all variables to match your environment.

- LandscapeNETMASK: Netmask of the main network of the use case.
- LandscapeGATEWAY: IP address of the gateway to reach other systems like SMT, systems in the internet, ...
- LandscapeSAPMedia: Can be deleted, if specified in the environemnt file and matching the use case needs. If you define it here as well the use case overwrites the environment value.
- LandscapeSAPHANAinstDir: HANA specific variable. Defines where to find the SAP HANA instalaltion media. The given directory must directly contain the SAP binaries hdblcm and hsbinst.
- LandscapeAYInFile: Name of the autoyast template file.
- LandscapeKVMInFile: Name of the KVM VM template file.
- LandscapeSUSE_MEDIA: Name of the iso file containing the SLES for SAP operating system to be installed.
- LandscapeDOMAIN: Currently unused?
- LandscapeSLES: Defines the use case to be level SLES11, SLES12 or maybe later SLES15 code base.
- LandscapeMemory: Default memory in GB per VM in the use case.
- LandscapeSystems: List ot systems to be configured/controlled in the use case. Each line defines a specific system which must belong to exact one owner/group. The system definition includes also the feinition of the first (main) network setup.

- **LandscapeInterfaces:** List of additional network interfaces to be configured and used in the use case. Each line defines a interface for one of the systems in the use case.
- **LandscapeDisks:** Default list of disks to be configured for usage by the VMs. Each line defines a disk, which could be either assigned to one specific VM (usage=vm) or as a shared disk to an owner (uage=owner).
- **LandscapeSAPHanaSR:** Defines the main topoogy of system replication sites.
- **LandscapeSAPHanaSO:** Defines which systems will be added to a site to build a scale out installation.

2.5 Ceate the Landscape Main Configuration File

The main configuration file of the Landscape software is `/etc/sysconfig/Landscape`. Adap the following Landscape configuration file and adjust the variables **LandscapeUseCase** and **LandscapeEnv**.

EXAMPLE 3: A TYPICAL LANDSCAPE CONFIGURATION FILE

```
## Path: System/Bootcamp/Landscape

## Description: Name of the landscape use case
## Type:      string
## Default:   Simple
#
LandscapeUseCase=MyScaleOut

## Description: Name of the landscape environment
## Type:      string
## Default:   Simple
#
LandscapeEnv=MySweetHome

## Description: Landscape nfs share mount point
## Type:      string
## Default:   /var/lib/Landscape
#
LandscapeRoot=/var/lib/Landscape/
#
## Description: main drectory for 'in' files
## Type:      string
## Default:   /usr/share/Landscape/LandscapeCore
```

```
#
LandscapeIn=/usr/share/Landscape/LandscapeCore/
## Description: main directory landscape
## Type:      string
## Default:   /usr/share/Landscape
#
LandscapeMain="/usr/share/Landscape"
```

Variables set in the main Landscape configuration file:

- **LandscapeUseCase:** Defines the name of the use case. In our example this is MyScaleOut. The name must match the middle part of the use case definition file.
- **LandscapeEnv:** Defines the name of the environment. In our example this is MySweetHome. The name must match the middle part of the environment definition file.
- **LandscapeRoot:** Defines the landscape NFS share which is used to share autoyast files, kvm definitions, SUSE and SAP media and even more.
- **LandscapeIn:** Normally this value should be not changed. It defines the directory of the Landscape package which contains autoyast templates and kvm templates and even more.
- **LandscapeMain:** Normally this value should be not changed. It defines the top level directory of the Landscape package which contains the scripts, autoyast templates and kvm templates and even more.

3 Phase II - Setup the Hypervisor, virtual Networks and virtual Systems

3.1 Installing a LandscapeHypervisor

- The LandscapeHypervisor must be installed with SLES for SAP 12 SP2 or newer.
- Install nfs-server, enable the service and export at least /data/Upload. /data/Upload must be available for read-write access without root-squash. Restart the NFS server or re-export the file systems.
- We use KVM as hypervisor technique, so all needed package for the hypervisor need to be installed (qemu-kvm, virt-manager, libvirt*)

- Enable and start the libvirtd service.
- The LandscapeHypervisor needs enough disk space for /data. The exact amount of disk space depends on the number of systems to be hosted, on the configured disk sizes and on the data to be shared for Upload and Download via that area.
- For SAP HANA SR Scale-Out you also need a NFS share per SR replication site. This share could either be provided by the LandscapeMaster or the LandscapeHypervisors. The share should reflect the SAP SID and Site Name like /data/nfs-scale-out/HA1/ROT1 and /data/nfs-scale-out/HA1/WDF1. The share should be read-writable for the VMs and should be a NFSv4 share to allow improved file locking.
- Depending on your Landscape networks it could be needed to configure network bridges (brX) using YaST.

3.2 Creating the networks for the Landscape environment

One of the first steps is to create virtual networks on the hypervisors which can be used by the virtual systems.

Logon as root on the LandscapeMaster and call the script automate-00-createNetworks:

```
cd /usr/share/Landscape/LandscapeCore/automate-VMs
./automate-00-createNetworks
```

As a result you should have created virtual networks on all effected hypervisors. Check the existence and, if needed, start them manually.

On the LandscapeHypervisor, user root:

```
virsh net-list --all
virsh net-start <network-name>
```

3.3 Creating the virtual systems including their disks

Logon as root on the LandscapeMaster and create the KVM virtual systems:

```
cd /usr/share/Landscape/LandscapeCore/automate-VMs
```

```
./automate-00-createDisks [--group=1]
./automate-00-createVMs [--group=1]
```

As a result you should have created virtual disks and defined virtual systems. The disks are placed in /data/vm/disk and organized in a directory structure reflecting the virtual system names and owners.

On the LandscapeHypervisor, user root

```
virsh list --all
find /data/vm/disk
```

3.4 Installing SLES using autoYaST

Logon as root on the LandscapeMaster and install SLES on the virtual systems:

```
cd /usr/share/Landscape/LandscapeCore/automate-VMs
./automate-01-install-sles [--group=1]
```

As a result you should have all systems of the landscape or from the specified owner installed with the SLES version referenced in the use case file (parameter LandscapeSUSE_MEDIA).

3.5 Finalize the Installation

Logon as root on the virtual systems and check, if they did already update the operating system using the SMT server.

Check the standardout and standarderror files of the postinstallation script. These files are placed in the home directory of the user root.

If all virtual systems have finished the update, we should reboot the systems to use the newest installed Linux kernels. Logon as root on the LandscapeMaster and create the KVM virtual systems:

```
cd /usr/share/Landscape/LandscapeCore/automate-VMs
./automate-05-reboot [--group=1]
```

Please check, if the systems are correctly configured to use your NTP server.



Note

The NTP client configuration must be added later to the Landscape scripts.

4 Phase III - Setup SAP HANA Scale-Out including System-Replication

Logon as root on the LandscapeMaster and create the KVM virtual systems:

```
cd /usr/share/Landscape/LandscapeCore/automate-SAPHanaSR-scaleOut  
./automate-010-install-hana [--group=1]
```

As a result you should have installed two scaleOut swarms configured with system replication.