

# Establishing a TSM Backup for Servers / VMs

## Establishing a TSM Backup for Debian 11 / 10 / 9 (Bullseye / Buster / Stretch)

(most likely also for other Debian based systems)

Download the IBM Tivoli Client Software (v7 is mandatory, v8 is not yet fully supported by the UIBK ADSM server):

- Version 8 branch:
  - Open [https://public.dhe.ibm.com/storage/tivoli-storage-management/maintenance/client/v8r1/Linux/LinuxX86\\_DEB/BA/](https://public.dhe.ibm.com/storage/tivoli-storage-management/maintenance/client/v8r1/Linux/LinuxX86_DEB/BA/)
  - Navigate in the directory with the newest version and get the tarball file (e.g. 8.1.20.0-TIV-TSMBAC-LinuxX86\_DEB.tar)
- Version 7 branch:
  - Download tarball from here: [ftp://ftp.software.ibm.com/storage/tivoli-storage-management/maintenance/client/v7r1/Linux/LinuxX86\\_DEB/BA/v718/7.1.8.0-TIV-TSMBAC-LinuxX86\\_DEB.tar](ftp://ftp.software.ibm.com/storage/tivoli-storage-management/maintenance/client/v7r1/Linux/LinuxX86_DEB/BA/v718/7.1.8.0-TIV-TSMBAC-LinuxX86_DEB.tar)
  - **or** from here: [https://public.dhe.ibm.com/storage/tivoli-storage-management/maintenance/client/v7r1/Linux/LinuxX86\\_DEB/BA/v718/7.1.8.0-TIV-TSMBAC-LinuxX86\\_DEB.tar](https://public.dhe.ibm.com/storage/tivoli-storage-management/maintenance/client/v7r1/Linux/LinuxX86_DEB/BA/v718/7.1.8.0-TIV-TSMBAC-LinuxX86_DEB.tar)

```
# Put the tarball in a separate directory and extract it:
# E.g., for version 7 branch:
mkdir TSMinstall; mv 8.1.20.0-TIV-TSMBAC-LinuxX86_DEB.tar TSMinstall; cd TSMinstall
tar xvf 8.1.20.0-TIV-TSMBAC-LinuxX86_DEB.tar

# Install the packages in following order:
# 1. gskcrypt64
# 2. gskssl64
# 3. tivsm-api64
# 4. tivsm-ba

# E.g., for version 8 branch:
dpkg -i gskcrypt64_8.0-55.31.linux.x86_64.deb
dpkg -i gskssl64_8.0-55.31.linux.x86_64.deb
dpkg -i tivsm-api64.amd64.deb
dpkg -i tivsm-ba.amd64.deb

# E.g., for version 7 branch:
dpkg -i gskcrypt64_8.0-50.78.linux.x86_64.deb
```

```
dpkg -i gskssl64_8.0-50.78.linux.x86_64.deb
dpkg -i tivsm-api64.amd64.deb
dpkg -i tivsm-ba.amd64.deb
```

```
# Check if Global Security Kit (GSKit) libraries are recognized by the
system:
```

```
gsk8ver_64
```

```
# If you get an 'library not found' error, e.g.
```

```
# 'gsk8ver_64: error while loading shared libraries: libgsk8cms_64.so:
cannot open shared object file: No such file or directory'
```

```
# you have to export Global Security Kit (GSKit) libraries by updating the
LD_LIBRARY_PATH:
```

```
export LD_LIBRARY_PATH=/usr/local/ibm/gsk8_64/lib64:$LD_LIBRARY_PATH
```

```
# Test it again, now you should get some reasonable output with:
```

```
gsk8ver_64
```

Now create the configuration files dms.sys, dsm.opt and inclexcl.def in /opt/tivoli/tsm/client/ba/bin/. Here are templates, please modify them to your corresponding servername/directories/files you want to backup/exclude.

[/opt/tivoli/tsm/client/ba/bin/dsm.sys](#)

```
SErvername  ADSM
NODENAME    #####_PUT_HERE_YOUR_NODENAME_#####
COMMMethod  TCPip
TCPport     1500
TCPserveraddress  adsm.uibk.ac.at
TCPCLIENTADDRESS  #####.uibk.ac.at
passwordaccess  generate
* SCHEDMODE    Polling
MANAGEDServices  schedule
SCHEDLOGname    /var/log/dsmsched.log
ERRORLOGname    /var/log/dsmerror.log
Incl excl      /opt/tivoli/tsm/client/ba/bin/inclexcl.def
schedlogmax    2047
```

The schedlogmax setting in dsm.sys sets the maximum logfile size for dsmsched.log and dsmwebcl.log to the entered value in MB and enables wrapping (similar to a ring buffer within the files). When not setting this variable or using 0 it allows the log file to grow indefinitely. To get to the point of the last entry in the log when wrapping is enabled search for **“END OF DATA”**. Use this option when you're low / limited on system storage.

[/opt/tivoli/tsm/client/ba/bin/dsm.opt](#)

```
SErvername  ADSM
* In die DOMAIN sind natürlich nur tatsächlich vorhandene Mountpoints
aufzunehmen
DOMAIN      /
```

```
FOLlowsymbolic    no
```

In `incl excl.def` you define which directories / files should be backed up or excluded:

[/opt/tivoli/tsm/client/ba/bin/incl excl.def](#)

```
INclude /home/.../*
INclude /etc/.../*
INclude /usr/.../*
INclude /var/.../*

EXclude dsmsched.log

EXclude.dir /bin
EXclude.dir /boot
EXclude.dir /dev
EXclude.dir /lib
EXclude.dir /lib64
EXclude.dir /lost+found
EXclude.dir /media
EXclude.dir /mnt
EXclude.dir /tmp

exclude.dir /.../lost+found
exclude.dir /.../.snapshot
exclude.dir /.../.cache
exclude *~
```

Now enter the dsm shell with:

```
dsmc
```

Test to log in (press RETURN when asking for Nodename, after that enter your password), then do a first incremental backup:

```
# !! These commands only work within the interactive dsmc console !!
incr

# Exit with
quit
```

After successfully testing and quitting dsmc, fix following startup script to work with Debian (10):

[/opt/tivoli/tsm/client/ba/bin/rc.dsmcad](#)

```
# 1. At the beginning of the script, find these two lines:
DSMCAD_DIR=/opt/tivoli/tsm/client/ba/bin
DSMCAD_BIN=$DSMCAD_DIR/dsmcad
```

```
# Only needed for Version 7:
# Directly after these two lines, ADD following line to find the GSKit
libraries:
export LD_LIBRARY_PATH=/usr/local/ibm/gsk8_64/lib64:$LD_LIBRARY_PATH

# Only needed for Version 7:
# 2. Find the following line:
if [ $NAME = "Ubuntu" ]
# and REPLACE it with:

if [ "$NAME" = "Ubuntu" -o "$NAME" = "Debian GNU/Linux" ]
```

Start & check the status of the TSM scheduler (dsmcad):

```
# In case you tried to start the scheduler before modifying the script, you
have to reload units to reload the source configuration with:
# systemctl daemon-reload

systemctl start dsmcad
systemctl status dsmcad

# enable for autostart after a reboot
systemctl enable dsmcad
```

---

## Error Debugging / Troubleshooting

### Error loading shared libraries

If you see an error on the dsmcad status and investigated via `journalctl -xe`, like:

```
dsmcad[7519]: /opt/tivoli/tsm/client/ba/bin/dsmcad: error while loading
shared libraries: libgsk8ssl_64.so: cannot open shared object file: No such
file or directory
```

You can fix it by adding the location of the libgsk8ssl to the path in a file in the `/etc/ld.so.conf.d` directory:

[/etc/ld.so.conf.d/TSM.conf](#)

```
/usr/local/ibm/gsk8_64/lib64
```

Set it active with

## ldconfig

You now should be able to successfully start up dsmscd without any error.

---

### Error with TSM accessing files with special characters / umlauts

If the `dsm*.logs` show errors while trying to backup files / directories with special characters, e.g. german umlauts, most likely you have set your default system locale to UTF8. Unfortunately, TSM does not support UTF-8, so you have to change your locale in order to backup all files including those with umlauts / special characters.

- Check your current system locale:

```
localectl
```

If the output is similar to `System Locale: LANG=en_US.UTF-8`, you have to change it.

- Check installed locales:

```
locale -a
```

- If `en_US` (without UTF8) is missing, you have to install it - edit `/etc/locale.gen`, uncomment `en_US ISO-8859-1` and save it. Then generate locale with

```
locale-gen en_US
```

Re-check again installed locales with `locale -a`, now you should see `en_US`.

- Change locale with

```
localectl set-locales LANG="en_US" LC_CTYPE="en_US"
```

and verify with

```
localectl
```

- Finally, restart dsmscd scheduler:

```
systemctl restart dsmscd
```

In the next run all files including those with special characters should be backed up.

---

### Final Steps

You can go on and check, if the scheduler process is started:

```
ps aux |grep dsm
# Example Output:
# root      68303  0.0  0.2 234384 25068 ?          Sl   15:17   0:00
/usr/bin/dsmcad

ls -la /var/log |grep dsm
cat /var/log/dsmsched.log
# Example Output:
# 04/25/22  15:18:02 Session established with server ADSM: AIX
# 04/25/22  15:18:02  Server Version 8, Release 1, Level 12.100
# 04/25/22  15:18:02  Server date/time: 04/25/22  13:18:02  Last access:
04/25/22  13:17:02
#
# 04/25/22  15:18:02 --- SCHEDULEREC QUERY BEGIN
# 04/25/22  15:18:02 --- SCHEDULEREC QUERY END
# 04/25/22  15:18:02 Next operation scheduled:
# 04/25/22  15:18:02 -----
-----
# 04/25/22  15:18:02 Schedule Name:          CS_INC_STD
# 04/25/22  15:18:02 Action:                  Incremental
# 04/25/22  15:18:02 Objects:
# 04/25/22  15:18:02 Options:
# 04/25/22  15:18:02 Server Window Start:    22:00:00 on 04/25/22
# 04/25/22  15:18:02 -----
-----
# 04/25/22  15:18:02 Scheduler has been stopped.
```

~~(a bit outdated) Docu for installing on Debian:~~

<https://wiki.uibk.ac.at/display/~c102mr/2011/05/15/Ubuntu+TSM+Server+Sicherung>



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## TSM Backup for systemd Red Hat based Linux Servers (e.g. RHEL / CentOS / Rocky Linux / Fedora)

For a backup via TSM please follow these steps:

- Go to
  - for branch 7:  
<https://public.dhe.ibm.com/storage/tivoli-storage-management/maintenance/client/v7r1/Linux/LinuxX86/BA/>
  - for branch 8:  
<https://public.dhe.ibm.com/storage/tivoli-storage-management/maintenance/client/v8r1/Linux/LinuxX86/BA/>
- Select the newest version and download the .tar file
- Extract the files in a temporary folder
- With `rpm -ivh` install the packages in the **following** order:

1. gskcrypt
2. gskssl
3. TIVsm-API64
4. TIVsm-APIcit
5. TIVsm-BA
6. TIVsm-BAcit

Configuration and further steps are details in the [ZID Unix-Docu, archived version](#)  **some parts there are outdated!** .

The software does not support UTF-8. It will skip files that have german umlauts in their path. To solve this set your locale to something without utf-8. [source](#) Changing the locale systemwide is possible with `localectl set-locale LANG="en_US" LC_CTYPE="en_US"`

To (auto)start the scheduler:  
`systemctl enable dsmcad`  
`systemctl start dsmcad`

If you are behind a firewall you should set the option `webports` to specific values and forward those ports on your firewall for the TSM server to be able to reach you.

## Upgrading a working TSM instance to the latest package

Use `rpm -Uvh` to upgrade the packages. TIV packages need to be updated with one single command, e.g.:

```
rpm -Uvh gskcrypt64-8.0.55.31.linux.x86_64.rpm  
gskssl64-8.0.55.31.linux.x86_64.rpm TIVsm-API64.x86_64.rpm TIVsm-  
APIcit.x86_64.rpm TIVsm-BA.x86_64.rpm TIVsm-BAcit.x86_64.rpm
```

## Restore

I found useful [documentation](#) about that part.

Example:

```
dsmc restore < sourcedir > < destdir > -latest
```

---

## Autostart & respawn the scheduler in RHEL / CentOS 6 & 7

Add in `/etc/inittab`

```
ad:2345:respawn:/bin/env LC_ALL=en_US /opt/tivoli/tsm/client/ba/bin/dsmc  
sched >/dev/null 2>&1
```

**Attention:** Beginning with RHEL/Centos 6 the /etc/inittab is deprecated in favor of new init system "Upstart"!

Auto-Start & respawn TSM in RHEL/Centos 6:

Go to /etc/init and create/edit a file dsmc-respawn.conf:

```
cd /etc/init/  
vim dsmc-respawn.conf
```

dsmc-respawn.conf

```
start on stopped rc RUNLEVEL=[2345]  
stop on runlevel [!2345]  
respawn  
exec /bin/env LANG=en_US /opt/tivoli/tsm/client/ba/bin/dsmc sched  
>/dev/null 2>&1
```

To autostart the dsm scheduler, use

```
initctl start dsmc-respawn
```

Check if the DSM scheduler is running:

```
ps aux |grep dsm  
tail /var/log/dsmsched.log
```

---

## [ALPHA] Quick & Dirty How-To:

- **von ZID-Operating:** Tivoli DSM-Sicherung TSM01C-serverseitig einrichten lassen (NODEname, username, System, Sicherungsart)
- Config anpassen: in /opt/tivoli/tsm/client/ba/bin/dsm.sys
- evtl. in TSM-Client Passwort ändern bzw. setzen (dsmc set password → schreibt TSM-Paßwort verschlüsselt nach /etc/adsm/TSM.PWD)
- manuelles TSM Backup starten (dsmc incr)
- nach yum-Updates von TSM über Repo uibk-zid-tools-rhel-6.4 TSM-Prozeß neu starten (stop tsm / start tsm / status tsm)

newest v7 Client is here (v8 is not supported by the server):

<ftp://ftp.software.ibm.com/storage/tivoli-storage-management/maintenance/client/v7r1/Linux/LinuxX86/BA/>

or here:

<ftp://public.dhe.ibm.com/storage/tivoli-storage-management/maintenance/client/v7r1/Linux/LinuxX86/BA/>

# Establishing a TSM Backup for Clients / PCs (Windows)

- Register your client PC at ZID-Operating. They will need information about:
  - NODENAME (=Hostname)
  - Username (c703nnn) - will be set up with your initial password ("Anfangspasswort")
  - System
  - "Sicherungsart"
- Download TSM-Client for Windows (Attention: TSM Client v8 doesn't work for Windows 7):
  - for branch 7:  
<http://ftp.software.ibm.com/storage/tivoli-storage-management/maintenance/client/v7r1/Windows/x64/>
  - for branch 8:  
<https://www3.software.ibm.com/storage/tivoli-storage-management/maintenance/client/v8r1/Windows/x64/>
- Go to the newest version, download the EXE file (e.g. 8.1.13.0-TIV-TSMBAC-WinX64.exe); run it to decompress the installation files
- Install it and if needed, copy missing DLL files to %SystemRoot%\system32
- Edit dsm.opt

## TSM (ADSM) Knowledge Base

- TSM (ADSM) uses Ports 1500, 1501 - make sure these are not blocked.
- TSM (ADSM) Forum :<https://adsm.org/forum/index.php>

## TSM Node-Passwörter

### Passwort am Client-Node

wird für den jeweiligen Node erstellt, lokal obfuskiert (nicht verschlüsselt) gespeichert und übermittelt über Option passwordaccess generate in dsm.opt bzw. dsm.sys .

### Passwort-Speicherort am Client-Node

- Windows: in Registry unter  
HKLM\Software\IBK\ADSM\CurrentVersion\Nodes\{nodename}\{servername}
- Linux: /etc/adsm/TSM.PWD bzw. /etc/adsm/TSM.sth

## Passwort zurücksetzen lassen

auf Anfangspasswort des persönlichen c-Accounts des Admins kann Gregor Danler (507-23418) vom ZID-Operating machen.

(Als Login wird vom TSM-Client allerdings **nicht** die c-Benutzerkennung verwendet, sondern der Node-Name!)

## Passwort ändern

```
dsmc set password
```

## Security-Infos

Von nicht aktuellen TSM-Clients obfuskiert gespeichertes Passwort kann auf Windows-Rechnern problemlos von jedem User ausgelesen werden:

<https://improsec.com/tech-blog/vulnerability-in-tsm>

## TSM (ADSM) Commands

All TSM commands can be entered on the command line with

```
/opt/tivoli/tsm/client/ba/bin/dsmc <options>
```

Interactive commands can be entered directly inside the "tsm> " console (just enter /opt/tivoli/tsm/client/ba/bin/dsmc to get into TSMinteractive mode).

## Query Backup (list backed up files/dirs)

Examples:

```
query backup "/"
q b "/home/"
q b "/etc/*"
q b "C:\*"
```

## Create manual incremental backup:

```
incr
```

## Restore single file (latest version)

Examples:

```
restore /home/bla/test.txt -latest
restore '/home/bla/!_crude_dir/Umlautää.txt' -latest
```

## Deleting specific files in TSM backup

*Your node does not have permission to delete backup files*

```
del backup /home/bla/test.txt
del backup /home/bla/*
del backup "/home/bla/*.bak" all
```

## ZID TSM-Server Infos

Installed TSM-Server-Version (Feb/2022):

IBM Spectrum Protect Server for AIX - Version 8, Release 1, Level 12.100

Supportmatrix

(<https://www.ibm.com/support/pages/ibm-spectrum-protect-server-client-compatibility-and-upgrade-considerations>) :

<b>IBM SPECTRUM PROTECT CLIENT SUPPORT</b>	
<b>includes the Backup-Archive, API, UNIX HSM, and Web clients that are compatible with, and currently supported with, IBM Spectrum Protect Servers and Storage Agents.</b>	
—	
<b>IBM Spectrum Protect Client Version</b>	<b>Supported IBM Spectrum Protect Server and Storage Agent Versions</b>
8.1.x where x>=2	8.1, 7.1
8.1.0	8.1, 7.1
7.1.x where x>=8	8.1, 7.1
7.1.x where 6>=x>=0	8.1, 7.1

## Debugging

### Known Issue with unknown libraries

#### DSMC not starting

```
/bin/env LC_ALL=en_US /opt/tivoli/tsm/client/ba/bin/dsmc sched
/opt/tivoli/tsm/client/ba/bin/dsmc: error while loading shared libraries:
libgsk8ssl_64.so: cannot open shared object file: No such file or directory
```

Check if Library is found and installed:

```
ldconfig -p | grep ssl
libssl.so.1.1 (libc6,x86-64) => /lib/x86_64-linux-gnu/libssl.so.1.1
libssl.so (libc6,x86-64) => /lib/x86_64-linux-gnu/libssl.so
```

```
dpkg -L gskssl64
/.
/usr
/usr/local
/usr/local/ibm
/usr/local/ibm/gsk8_64
...
```

Create

[/etc/ld.so.conf.d/tsm.conf](#)

```
/usr/local/ibm/gsk8_64/lib64
```

and rebuild the ld database:

```
ldconfig
```

From:

<https://ifi-wiki.uibk.ac.at/> - IFI Wiki

Permanent link:

<https://ifi-wiki.uibk.ac.at/public/tsm-backup?rev=1701856007>

Last update: **2023/12/06 10:46**