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:

- Version 8 branch:
  - Open 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. `8.1.27.0-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
  - **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

```
# Put the tarball in a spearate directory and extract it:
# E.g., for version 8 branch:
mkdir TSMinstall; mv 8.1.27.0-TIV-TSMBAC-LinuxX86_DEB.tar TSMinstall; cd TSMinstall
tar xvf 8.1.27.0-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_8.0-60.4.linux.x86_64.deb
dpkg -i gskssl64_8.0-60.4.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
Inclexcl            /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 `inclexcl.def` you define which directories / files should be backuped or excluded:

/opt/tivoli/tsm/client/ba/bin/inclexcl.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 dsmcad 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 likekely 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-locale LANG="en_US" LC_CTYPE="en_US"
  ```

  and verify with

  ```
  localectl
  ```

- Finally, restart dsmcad scheduler:

  ```
  systemctl restart dsmcad
  ```

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

ANS1592E Failed to initialize SSL protocol.

UIBK only!

In some (rare) cases, you can experience this error when trying to connect with `dsmc` after a fresh install.

Unlike the error may suggest, the problem lies on the server side. ZID has to do follwing steps to correct that:

- (Re)set your node password to a different one
- Correct the Node Registration (set session security to transitional)

There are some ZID-Tickets addressing this issue, e.g. https://zid-ts.uibk.ac.at/browse/SYSOP-101605

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 futher 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 you 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
```

Debugging

On older RedHat based systems you may get some errors while updating, e.g.

```
error: Failed dependencies:
        libc.so.6(GLIBC_2.14)(64bit) is needed by TIVsm-
API64-8.1.20-0.x86_64
        libstdc++.so.6(GLIBCXX_3.4.15)(64bit) is needed by TIVsm-
API64-8.1.20-0.x86_64
        libc.so.6(GLIBC_2.14)(64bit) is needed by TIVsm-BA-8.1.20-0.x86_64
        libstdc++.so.6(GLIBCXX_3.4.15)(64bit) is needed by TIVsm-
BA-8.1.20-0.x86_64
```

You have to update glibc to minimum version v2.14 AND libstdc (GLIBCXX) to minimum version v3.4.15.

Beginning with IBM Spectrum Protect backup-archive client level 8.1.19, the operating system RHEL 6 and SLES 11 are no longer supported, as stated here:
https://www.ibm.com/support/pages/apar/IT44180

You can update to the latest supported version v8.1.17 :

```
cat /etc/redhat-release
wget https://public.dhe.ibm.com/storage/tivoli-storage-
management/maintenance/client/v8r1/Linux/LinuxX86/BA/v8117/8.1.17.0-TIV-
TSMBAC-LinuxX86.tar
tar xvf 8.1.17.0-TIV-TSMBAC-LinuxX86.tar
rpm -Uvh gskcrypt64-8.0.55.29.linux.x86_64.rpm
gskssl64-8.0.55.29.linux.x86_64.rpm TIVsm-API64.x86_64.rpm TIVsm-
APIcit.x86_64.rpm TIVsm-BA.x86_64.rpm TIVsm-BAcit.x86_64.rpm
```

However, you can manually update the required libraries. This is not a clean way of updating, but tested working in several machines running CentOS 6:

```
cd /tmp/TSMinstall
mkdir glibc; cd glibc

# Check installed version(s) of glibc
ldconfig  -p | grep libc.so
strings /lib64/libc.so.6 | grep GLIBC

# Download glibc v2.17 libraries compiled to work for CentOS 6 Systems
# Source: https://gist.github.com/harv/f86690fcad94f655906ee9e37c85b174
wget http://copr-be.cloud.fedoraproject.org/results/mosquito/myrepo-
el6/epel-6-x86_64/glibc-2.17-55.fc20/glibc-2.17-55.el6.x86_64.rpm
wget http://copr-be.cloud.fedoraproject.org/results/mosquito/myrepo-
el6/epel-6-x86_64/glibc-2.17-55.fc20/glibc-common-2.17-55.el6.x86_64.rpm
wget http://copr-be.cloud.fedoraproject.org/results/mosquito/myrepo-
el6/epel-6-x86_64/glibc-2.17-55.fc20/glibc-devel-2.17-55.el6.x86_64.rpm
wget http://copr-be.cloud.fedoraproject.org/results/mosquito/myrepo-
```

```
el6/epel-6-x86_64/glibc-2.17-55.fc20/glibc-headers-2.17-55.el6.x86_64.rpm

# You might have to install missing packet glibc-common and/or remove i686
version of glibc on 64bit systems:
# yum install glibc-common
# yum remove glibc.i686

# Update glibc to v2.17
rpm -Uvh glibc-2.17-55.el6.x86_64.rpm glibc-common-2.17-55.el6.x86_64.rpm
glibc-devel-2.17-55.el6.x86_64.rpm glibc-headers-2.17-55.el6.x86_64.rpm

# Check again installed version(s) of glibc, you should now have v2.17
strings /lib64/libc.so.6 | grep GLIBC


# now update libstdc++ (GLIBCXX):

# check GLIBCXX-Version
strings /usr/lib64/libstdc++.so.6 |grep LIBCXX

# Download libstdc++ v4.8.5 libraries
cd /tmp/TSMinstall
mkdir libstdc; cd libstdc
wget
https://rpmfind.net/linux/centos/7.9.2009/os/x86_64/Packages/libstdc++-4.8.5
-44.el7.x86_64.rpm

# Update libstdc++ to v4.8.5
rpm -Uvh libstdc++-4.8.5-44.el7.x86_64.rpm

# check GLIBCXX-Version again, should now be > the required GLIBCXX_3.4.15
strings /usr/lib64/libstdc++.so.6 |grep LIBCXX

# all dependencies should now be fixed, so you can finally install TSM 8:
cd ..
rpm -Uvh gskssl64-8.0.55.31.linux.x86_64.rpm
gskcrypt64-8.0.55.31.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 backuped 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) :

IBM SPECTRUM PROTECT CLIENT SUPPORT **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.** —	
IBM Spectrum Protect Client Version	**Supported IBM Spectrum Protect Server and Storage Agent Versions**
8.1.x where x>=2	8.1, 7.1
8.1.0	8.1, 7.1

IBM SPECTRUM PROTECT CLIENT SUPPORT **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.** —	
IBM Spectrum Protect Client Version	**Supported IBM Spectrum Protect Server and Storage Agent Versions**
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

Last update: **2026/08/18 17:15**