

# Solaris/ OmniOS server for Apple clients

## First steps

## Solarish/OmniOS server and OSX clients

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## OmniOS (Solaris) and OSX clients

OmniOS with napp-it is a fast and easy server for Apple clients. You can access OmniOS via iSCSI, NFS or SMB (and rsync or S3) after a simple on/off ZFS filesystem setting.

The screenshot shows the napp-it pro omnisan ZFS appliance interface. The top navigation bar includes 'About', 'Help', 'Services', 'System', 'User', 'Disks', 'Pools', 'ZFS Filesystems', 'Snapshots', 'Comstar', 'Jobs', 'Extensions', 'VM', 'Threema', and 'key'. The main content area is titled 'ZFS Filesystems (shares and base settings) acc'. Below this is a table with columns for various filesystem properties and their status.

ZFS (all properties)	SMB	NFS	RSYNC	FC_IB_SCSI	S3cloud	NBMAND	REC	AVAILABLE	USED	RES	RFRES	QUO	RFQU	SSB	SYNC	COMPR	DEDUP	CRYPT	SOURCE	FOLDER ACL	SHARE ACL	PERM	RDONLY
daten1 (pool)-		-	-	-	-	off	128K	1.91T [27%]	5.21T	none	100G	none	none	-	standard	lz4	off	off		special	-	ACL	off
daten1/_Pool_Benchmark	off	off	off	zfs unset	unset	off	128K	1.81T	3.00G	none	none	none	none	-	always	off	off	off		default ACL	-	755	off
daten1/backup_applianc...	off	off	off	zfs unset	unset	off	128K	1.81T	20.8M	none	none	none	none	-	standard	lz4	off	off		default ACL	-	700	off
daten1/backup_iso	backup_iso	off	off	zfs unset	unset	on	128K	1.81T	1.00T	none	none	none	none	-	standard	lz4	off	off		every@=mod	every@=full	ACL	off
daten1/conny	description=cccccs...	off	off	zfs unset	unset	on	128K	1.81T	1.02T	none	none	none	none	-	standard	lz4	off	off		every@=mod	every@=full	ACL	off
daten1/denise	denise	off	off	zfs unset	unset	off	128K	1.81T	1.31G	none	none	none	none	-	standard	lz4	off	off		every@=mod	every@=full	ACL	off
daten1/guenther	guenther	off	off	zfs unset	unset	on	128K	1.81T	2.33T	none	none	none	none	-	standard	lz4	off	off		special	every@=full	ACL	off
daten1/media	media,a	root..	off	zfs unset	unset	off	128K	1.81T	610G	none	none	none	none	-	standard	lz4	off	off		every@=mod	every@=full	ACL	off
daten1/napp-it	napp-it	off	off	zfs unset	unset	on	128K	1.81T	17.3G	none	none	none	none	-	standard	lz4	off	off		every@=mod	every@=full	ACL	off
daten1/nfs	nfs	on	off	zfs unset	unset	on	128K	1.81T	133G	none	none	none	none	-	standard	lz4	off	off		every@=mod	every@=full	ACL	off
daten1/timecapsule	timecapsule	off	off	zfs unset	unset	on	1M	1.81T	18.4G	none	none	none	none	-	disabled	lz4	off	off		special	every@=full	ACL	off
daten1/tm12	tm12	off	off	zfs unset	unset	on	128K	1.81T	132K	none	none	none	none	-	standard	lz4	off	off		every@=mod	every@=full	ACL	off
daten1/zones	zones	off	off	zfs unset	unset	on	128K	1.81T	424K	none	none	none	none	-	standard	lz4	off	off		every@=mod	every@=full	ACL	off
nvme (pool)-		-	-	-	-	off	128K	319G [81%]	77.2G	none	36G	none	none	-	standard	off	off	off		special	-	ACL	off
nvme/nfs	nfs	on	off	zfs unset	unset	on	128K	283G	41.2G	none	none	none	none	-	standard	lz4	off	off		every@=mod	every@=full	ACL	off

### 1.) iSCSI

iSCSI is a method to provide a zvol (a ZFS dataset treated as a blockdevice) as a network target. Such a target can be connected by one Mac at a time (no concurrent use by several Macs), used there quite like a removable local USB disk and formatted to any supported OSX filesystem ex APFS. OSX does not include the needed initiator software to connect network targets. Unlike Windows you need a 3rd party initiator for OSX, google for „initiator osx“ for available options.

To provide an iSCSI target, use napp-it menu „ZFS Filesystems“ and activate an iSCSI target in the row of a filesystem under iSCSI with a settable size. This creates a zvol below this filesystem with a name that includes the guid and a target with all needed settings. You can replicate such a zvol like other ZFS filesystems. To re-enable such a replicated zvol as a target, simply set iSCSI again to on on the destination server. Such a sharing „as a filesystem property“ with a simple on/off setting, similar to NFS and SMB simplifies target handling with Comstar, the enterprise class FC/iSCSI stack in Solaris based operating systems, [https://docs.oracle.com/cd/E23824\\_01/html/821-1459/fncoz.html](https://docs.oracle.com/cd/E23824_01/html/821-1459/fncoz.html)

The screenshot shows the napp-it pro omnisan ZFS appliance interface with a modal window open for configuring an iSCSI target. The window title is 'daten1/media: share\_iscsi'. The main content area is titled 'Change property daten1/media:- share\_iscsi'. It includes a dropdown menu for 'ISCSI-share' set to 'daten1/media' and a 'set on' button. Below this, there are sections for 'Base settings (all settings see menu Comstar)', 'Volume:' (create /dev/zvol/rdsk/daten1/media/iscsi\_(lu-ld2)), 'Volume Size' (1 Terabyte), and 'Block Size' (64KB). There is also an 'Advanced settings (monitor extension)' section and a 'set property' button. A note at the bottom states: 'You can destroy volumes or logical units, modify settings or create advanced configs in menu Comstar'.

## 2.) NFS (Network FileSystem)

NFS (originally developed by Sun together with ZFS) is a method to share a regular ZFS filesystem for one or more hosts. With NFS v3 it is a very simple and fast method to connect a ZFS filesystem via ip. On Solaris based operating systems, NFS is part of the OS and a ZFS filesystem property. To activate NFS sharing, use napp-it menu „ZFS Filesystems“ and set NFS to on or off for a filesystem under NFS. As NFS v3 does not provide authentication (user login with name/password) or authorisation (access restrictions based on verified users) NFS is a sharing method for trusted networks where simplicity and performance is the main concern. Often you use NFS for VM or video storage. A (fakeable) minimal access restriction can be set either based on the client ip or the Unix uid of the creator of a file. The uid of a created file depends on client OS. This is either the uid of a client or „nobody“. If you want to access files via NFS from several clients, prefer a fully open permission setting of files (ex allow everyone@ at least modify permissions, optionally force such a setting recursively in menu ZFS Filesystems under Folder ACL). To avoid permission modifications from clients set sclmode (ZFS property) to restricted. If you want to restrict access based on client ip when enabling a share, enter for example `rw=@192.168.1.0/24,root=@192.168.1.0/24` instead the simple „on“. The root= option is similar to no\_root\_squash on Linux and allows root access to all files.

napp-it pro omnisan ZFS appliance Pro v. 22.dev dec 02.2022

About Help Services System User Disks Pools ZFS Filesystems Snapshots Comstar Jobs Extensions V

home » ZFS Filesystems

> Create > Rename > Destroy > Rollback > Encryption > Datamover > ACL extension > ZFS info > Delete ZFS buffer

processing, please wait..

ZFS (all properties)	SMB	NFS	RSYNC	FC,IB,iSCSI	S3cloud	NBMAND	REC	AVAILABLE	USED
daten1/zones: sharenfs								28K 1.91T [27%]	5.21T
Change property daten1/zones/: sharenfs								28K 1.81T	3.00G
sharenfs = <input type="text" value="rw=@192.168.1.0/24,root=@192.168.1.0/24"/>								28K 1.81T	20.8M
set nfs-sharing of daten1/zones to on								28K 1.81T	1.00T
optional:								28K 1.81T	1.02T
rw=host1:host2:host3,root=host1:host2:host3,ro=host4 ZFS								28K 1.81T	1.31G
example:								28K 1.81T	2.33T
rw=@192.168.1.0/24,root=@192.168.1.0/24								28K 1.81T	610G
daten1/tmccapsac	tmccapsac	on	on	zfs unset	unset	on		28K 1.81T	17.3G
daten1/tm12	tm12	off	off	zfs unset	unset	on	128K	1.81T	133G
daten1/zones	zones	off	off	zfs unset	unset	on	128K	1.81T	18.4G
								128K	1.81T
								128K	1.81T

Suggested ZFS properties for NFS shares:

sync default (a client can decide to sync write or not)

nbmand on

To connect an NFS share from OSX:

Click on „Go“ in finder.

Click on „connect to server“

Enter the following: „nfs://<device name or IP>/poolname/filesystemname“

ex: nfs://192.168.2.1/tank/data

If SMB is an alternative, prefer SMB over NFS. It is quite as fast and offers access control. If you enable NFS+SMB for a filesystem avoid concurrent editing. If you want to restrict SMB access, set Share ACL in menu ZFS Filesystems when enabling the SMB share or in menu ZFS filesystems > Share ACL.

### 3. SMB

On OmniOS you can provide SMB shares via SAMBA or the multithreaded kernelbased SMB server that is part of the Solaris operating systems. Mostly you use the kernelbased one due its easyness/ zero config behaviour, Windows ntfs alike ACL with inheritance and Windows sid (superiour to standard Unix permissions based on Unix uid). To activate NFS sharing, use napp-it menu „ZFS Filesystems“ and set SMB to on or off. As an additional sharing option you can enable guest or access based enumeration/ABE or set share ACL.

Suggested ZFS properties for SMB shares:

```
sync=default (a client can decide to sync write or not)
nbmand=on
aclmode and aclinherit=passthrough
```

To connect an SMB share from OSX:

Click on „Go“ in finder.  
Click on „connect to server“  
Enter the following: „SMB://<device name or IP>/sharename“  
ex: SMB://192.168.2.1/data

#### 3.1 SMB and Bonjour/mDNS

This is the Apple method to detect network shares, printers or Timemachine backup devices. OmniOS/ napp-it enables mDNS in menu Services > Bonjour and Autostart.

Select:

- enable Bonjour
- enable advertizing of SMB shares (shows OmniOS with a nice Xserve icon)
- enable Timemachine support (SMB share is automatically offered in Timemachine settings)
- select the SMB share that you want to advertice as Timemachine backup device

Timemachine support needs the OmniOS SMB APL extensions (kernelbased SMB server).

You can disable OmniOS APL extensions (kernelbased Illumos SMB server) in a configfile ex apl in /etc/system/system.d (reboot required). Some Apple SMB features like Timemachine are then not working.

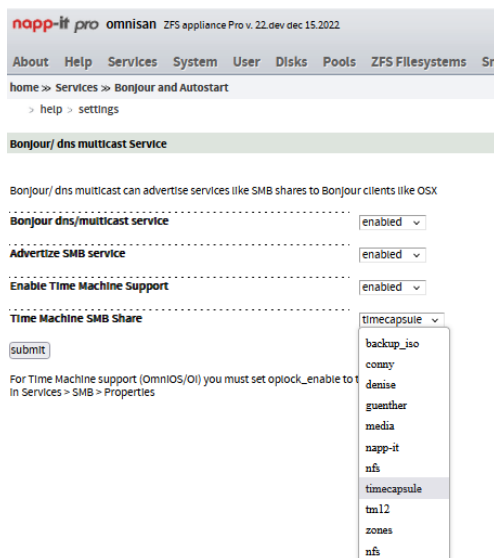
ex file /etc/system.d/apl

\* disable APL file extension, ex on locking problems in Avid Media Composer

```
set smb2srv:smb2_aapl_use_file_ids=1 #
```

\* or disable all APL extensions

```
set smb2srv:smb2_aapl_extensions=0 # disable all Apple extensions
```



### 3.2 ZFS Snaps and OSX

On Windows you have direct and zero config access to ZFS snaps on OmniOS via „Windows Previous Versions“. On OSX there is no similar way ex for Timemachine but as ZFS snaps and shares are a strict ZFS filesystem property you do not need to configure anything for snap access. Best way to access ZFS snaps on OSX is:

Click on „Go“ in finder.

Click on „connect to server“

Enter the following: „SMB://<device name or IP>/sharename/.zfs/snapshot“

ex: SMB://192.168.2.1/data/.zfs/snapshot

You can then access and search all ZFS snapshots via Finder (ZFS snaps are readonly)

### 3.3 ZFS filesystem as Timemachine device (Time Capsule)

If you have advertized a filesystem as Timemachine device in 3.1, you can select the share in Timemachine settings. Other option is to connect any SMB share. When connected this share is also available as a target.

SMB Settings (Service > SMB > properties)

min\_protocol=2.1

oplock\_enable=true

signing\_enabled=false

signing\_required=false

ZFS filesystem settings for Timemachine ex timecapsule

sync disabled

nbmand on

### 3.4 NFS4 ACL and OSX

The Solaris kernelbased SMB server uses only and always Windows ntfs alike file/ folder ACL with inheritance, Share ACL, Windows compatible local SMB groups and Windows SID as security reference. None of them are known under OSX. This means that while OSX must obey all ACL settings, you cannot view or edit them on OSX. You must either set them on napp-it or from a Windows machine.

The screenshot shows the napp-it Pro web interface for configuring ACLs. The breadcrumb trail is: home » ZFS Filesystems » ACL extension » ACL on folders. The current configuration is for the folder /daten1/media. Below this, there is a table of ACL rules:

ACL	User/ Group	acl	acl-set	details	Inheritance	type	option
0	user:root	rxpdaARWcCos	full_set	rd(aci,att,xatt) wr(aci,att,xatt,own) add(fi,sdir) del(yes,child) x, s	file_dir	allow	delete
1	everyone@	rxpdaARWc-s	modify_set	rd(aci,att,xatt) wr(att,xatt) add(fi,sdir) del(yes,child) x, s	file_dir	allow	delete

### 3.5 Tuning and performance

For best performance ex on a 10G+ network, increase ip and NFS buffers/servers in napp-it menu System > Tuning. Another option is to use Jumboframes (must be supported and enabled on any host, client or switch). In general the multithreaded OmniOS kernelbased SMB server with Open-ZFS is very fast and perfectly integrated into ZFS but not as fast as Oracle Solaris 11.4 with native ZFS.

### 4.0 OSX problems

NFS and SMB client or server problems on OSX are more common than on Linux or Windows. One of the reasons is that Apple does not care about the standards from outside the Apple world (SMB is basically the share method from the Windows world. Other servers like SAMBA or Solaris SMB follows Windows first then optionally care about Apple). Apple removes or adds features, does not matter if non Apple equipment does not work any longer without tweaks or at all.

First check SMB server settings In menu Service > SMB properties.

```
oplock_enable=true
signing_enabled=false
signing_required=false
```

Then check ZFS properties of a shared filesystem

```
set nbmand to on
set aclinherit and aclmode to pass-through (menu ZFS filesystems > Folder ACL)
```

On some problems try a different setting but switch back if it does not solve a problem

On remaining OSX problems like Timemachine not working, slow access, sudden disconnects or missing files on a share, the next tip is to update OSX and OmniOS to the newest available and supported release. On OSX update at least to 10.15 that is under support until autumn 2022. Up from 2023 prefer at least OSX v11.

If an update does not solve a problem:

- google with the OSX release ex „OSX 11 SMB problem“ as each OSX has its own problems and solutions and try the suggested solutions
- try to connect via SMB1 (slower than SMB2/3) via  
Finder > Go > connect to server: cifs://ip/share ex cifs://192.168.2.1/data
- search or ask at the maillists illumos-discuss or omnios-discuss (<https://illumos.topicbox.com/latest>) for help

5. More manuals, see [https://www.napp-it.org/manuals/index\\_en.html](https://www.napp-it.org/manuals/index_en.html)