

# FreeNAS backup to S3 and ZFS replication

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# FreeNAS backup and replication

- **FreeNAS ( freeBSD, ZFS NAS )**

- Stable open-source multi-protocol NAS for servers, ESX, NFS shares, iSCSI, etc.
- Best with many HD, SSD, >16G RAM
- My lab/office NAS serves:
  - VM's, ISO, Plex DVR, Music, etc.



Dell 2950 III 32GB

6 x 2TB NL-SAS

# FreeNAS backup and replication

- **How to Backup FreeNAS ?**

- Supported Options in FreeNAS v11.1
  - CloudSync to S3, Azure, GCP
  - ZFS send ( to another ZFS server )
- Cloud Sync great for:
  - Many small files
  - Large immutable files ( ISO's , etc. )
- Cloud Sync not ideal for Running VM's

# FreeNAS backup and replication

- **How to Backup FreeNAS ?**

- Option 1, Cloud Sync

- S3, Azure, GCP, support via rclone
- All changed files uploaded again.
- Encryption support in 11.2 (rel 6/5/18 )

- Rclone

- [https://rclone.org/commands/rclone\\_sync/](https://rclone.org/commands/rclone_sync/)
- Similar to rsync -delete
- Compares modtime, size by default ( not checksum)

# FreeNAS backup and replication

## • How to Backup FreeNAS ?

### – Add s3 cloud sync

- Push/Pull
- Cred (key/secret)
- Bucket
- Folder
- Local NAS path
- Copy or Sync  
(sync works like rsync -delete )

The screenshot shows the configuration page for a backup job in FreeNAS. The fields are as follows:

- Description:** Sync FSoftware
- Direction:** Push (with an information icon)
- Provider:** Credential
  - FreeNAS\_CloudSync (dropdown)
  - Amazon S3 Buckets
    - 4aero.com (dropdown)
    - Folder: FreeNAS/FreeNAS\_FSoftware
    - Server Side Encryption: None (dropdown)
- Path:** /mnt/bigpool/FSoftware (with a Browse button)
- Transfer Mode:** Sync (dropdown)
- Minute:** Every N minute (selected) / Each selected minute
  - 00 01 02 03 04 05 06 07 08 09 (grid)

# FreeNAS backup and replication

## • S3 policy

- GUI needs two parts
- List all buckets
- Bucket 4aeroBackup
  - Bucket itself
  - contents of 1 folder only

```
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Sid": "VisualEditor0",
      "Effect": "Allow",
      "Action": [
        "s3:ListAllMyBuckets",
        "s3:HeadBucket"
      ],
      "Resource": "*"
    },
    {
      "Sid": "VisualEditor1",
      "Effect": "Allow",
      "Action": [
        "s3:PutAnalyticsConfiguration",
        "s3:GetObjectVersionTagging",
        "s3:CreateBucket",
        "s3:ReplicateObject",
        "s3:GetObjectAcl",
        "s3>DeleteBucketWebsite",
        "s3:PutLifecycleConfiguration",
        "s3:GetObjectVersionAcl",
        "s3:PutObjectTagging",
        "s3>DeleteObject",
        "s3:GetIpConfiguration",
        "s3>DeleteObjectTagging",
        "s3:GetBucketWebsite",
        "s3:PutReplicationConfiguration",
        "s3>DeleteObjectVersionTagging",
        "s3:GetBucketNotification",
        "s3:PutBucketCORS",
        "s3:GetReplicationConfiguration",
        "s3:ListMultipartUploadParts",
        "s3:PutObject",
        "s3:GetObject",
        "s3:PutBucketNotification",
        "s3:PutBucketLogging",
        "s3:PutAnalyticsConfiguration",
        "s3:GetObjectVersionForReplication",
        "s3:GetLifecycleConfiguration",
        "s3:ListBucketByTags",
        "s3:GetInventoryConfiguration",
        "s3:GetBucketTagging",
        "s3:PutAccelerateConfiguration",
        "s3>DeleteObjectVersion",
        "s3:GetBucketLogging",
        "s3:ListBucketVersions",
        "s3:ReplicateTags",
        "s3:RestoreObject",
        "s3:ListBucket",
        "s3:GetAccelerateConfiguration",
        "s3:GetBucketPolicy",
        "s3:PutEncryptionConfiguration",
        "s3:GetEncryptionConfiguration",
        "s3:GetObjectVersionTorrent",
        "s3:AbortMultipartUpload",
        "s3:PutBucketTagging",
        "s3:GetBucketRequestPayment",
        "s3:GetObjectTagging",
        "s3:GetMetricsConfiguration",
        "s3>DeleteBucket",
        "s3:PutBucketVersioning",
        "s3:PutObjectAcl",
        "s3:ListBucketMultipartUploads",
        "s3:PutMetricsConfiguration",
        "s3:PutObjectVersionTagging",
        "s3:GetBucketVersioning",
        "s3:GetBucketAcl",
        "s3:PutInventoryConfiguration",
        "s3:PutIpConfiguration",
        "s3:GetObjectTorrent",
        "s3:PutBucketWebsite",
        "s3:PutBucketRequestPayment",
        "s3:GetBucketCORS",
        "s3:GetBucketLocation",
        "s3:ReplicateDelete",
        "s3:GetObjectVersion"
      ],
      "Resource": [
        "arn:aws:s3:::4aeroBackup",
        "arn:aws:s3:::4aeroBackup/FreeNAS/*"
      ]
    }
  ]
}
```

# FreeNAS backup and replication

## FreeNAS ?

- Option 2 - ZFS replication
- Binary incremental diff
  - snapshot to snapshot
- No FS traversal to find diffs !
- No checksum computations
- Optional VM quiesce before snapshot (vCenter)

# FreeNAS backup and replication

- **FreeNAS ZFS replication**

- Cloud provider ( Rsync.net )
- freeBSD VM
  - 1TB+
  - ssh access ( provide FreeNAS public ssh key )
- Use freeNAS GUI provided SSH public key not root's key
- Remote Host key ( used for known\_hosts entry)



# FreeNAS backup and replication

## • Add Replication

- Remote vol/folder
- Compress = lz4
- Remote hostname
- Encrypt Cipher - fast
- Remote Hostkey  
click “ssh key scan” to populate

Edit

Volume/Dataset:	bigpool/ftpsite
Remote ZFS Volume/Dataset:	data1/ftpsite
Recursively replicate child dataset's snapshots:	<input type="checkbox"/>
Delete stale snapshots on remote system:	<input checked="" type="checkbox"/>
Replication Stream Compression:	lz4 (fastest)
Limit (kB/s):	0
Begin:	03:00:00
End:	03:30:00
Enabled:	<input checked="" type="checkbox"/>
Remote hostname:	9647.zfs.rsync.net
Remote port:	22
Dedicated User Enabled:	<input type="checkbox"/>
Dedicated User:	
Encryption Cipher:	Fast
Remote hostkey:	9647.zfs.rsync.net ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAQDFTs00sXYTQ EeIsUFETVUiThGWXJSWAUyd6wpthMiZIHcmk46gKf QeW1LH/gefmQcULyVZk+lNc3spE09/GAuu8eJWBge cKGTsrHRT98PXKUW3TGMTXLT1/4gBvgCgAjbe+lM5 2ikedCa5Puf2yjaJ03qfEkvvvSBKLLPaJ5dUx9RHR 5k6A4RLLjwCJXeKAr78dGoKTEkvXEjeXg642fHfj0 mpepaL2uajmeRnS1+6qJk4ZiwwajwSyaSANYU4wJ3 IpebyAsdTOY5Q3uyrkNN/5UbHn7VD20reQhStzpu GrL4GtC+rxTr6WHyIapTBmf1Nr67j/3kpSaZRo/JD ovB 9647.zfs.rsync.net ecdsa-sha2-nistp256 AAAAE2VjZHNhLXNoYTItbmlzdHhAYnTYAAAAIbmlzd HAYNTYAAABBBCTY0wKvYwGZrcZNC5d0/op/03P0w kwbr16AyXSakv3s48Ql8fZHRq+2adMU000fsEJeJW FFnMO+0Vzs+4ktNU= 9647.zfs.rsync.net ssh-ed25519 AAAAC3NzaC1lZDI1NTE5AAAAIJZ8HCHP19hJ1dSjs U3E3N6owsud774+VuGlwweYuAL5

OK Cancel Delete SSH Key Scan

# FreeNAS backup and replication

- **Rsync.net**

- Instructions on-line only for rsync, not ZFS.
- Requires 1TB+ account
- [Arstecnica](#)
- Rsync.net

# FreeNAS backup and replication

- **Other Links**

- Building a physical NAS on Dell server.
- Overview of ZFS and Nexenta
- ZFS mirror expansion issue

**Questions ?**