Programming the Shack SAN for the article "Backup Practice 2 using a Raspberry Pi"

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(Expected times in {})

```
###Download and install updates
___ pi@raspberrypi:$ sudo apt-get update     {~30 secs}
___ pi@raspberrypi:$ sudo apt-get upgrade    {~20 mins}


###add support for NTFS formatted drives
___ pi@raspberrypi:$ sudo apt-get install ntfs-3g    {~5 secs}

###add support for exfat supported drives
___ pi@raspberrypi:$sudo apt-get install exfat-utils exfat-fuse    {~10 secs}

###install RAID Manager
___ pi@raspberrypi:$ sudo apt-get install mdadm -y    {~1 min}

###install SAMBA server
___ pi@raspberrypi:$ sudo apt-get install samba samba-common-bin    {~1 min}

###show pathnames for USB
___ pi@raspberrypi:$lsblk
```


Make a note of both devices as you will need the pathnames. In this example,

the two drives would be /dev/sda1 and /dev/sdb1.

###Verify that the disk has no segments on it. Do this for both disks

___ pi@raspberrypi:$ sudo fdisk /dev/sda1

###Print the partitions on the disk:

Command (m for help): p

###Delete any existing partitions:

Command (m for help): d

###Create new partitions on the disk:

Command (m for help): n

###Select "p" for primary partition:

Command (m for help): p

###Save the new disk configuration:

Command (m for help): w

###Repeat for the second USB drive:

___ pi@raspberrypi:$ sudo fdisk /dev/sdb1

###Print the partitions on the disk:

Command (m for help): p

###Delete any existing partitions:

Command (m for help): d

###Create new partitions on the disk:

Command (m for help): n

###Select "p" for primary partition:

Command (m for help): p

###Save the new disk configuration:

Command (m for help): w

###download and install RAID Manager
___ pi@raspberrypi:$ sudo apt-get install mdadm -y

###Create the RAID 1 array – Don't enter the parenthesis –
###They are just used to highlight two Hyphens
___ pi@raspberrypi:$ sudo mdadm (- -)create (- -)verbose /dev/md/vol1 (- -)level=1
(- -)raid-devices=2 /dev/sda1 /dev/sdb1

For Example. The above will look like
___ pi@raspberrypi:$ sudo mdadm - -create - -verbose /dev/md/vol1 - -level=1
- - raid-devices=2 /dev/sda1 /dev/sdb1

###Confirm the RAID array
___ pi@raspberrypi:$ sudo mdadm (--)detail /dev/md/vol1

```
pi@NCJ-nas:~ $ sudo mdadm --detail /dev/md/vol1
/dev/md/vol1:
           Version : 1.2
     Creation Time : Thu Oct 15 20:53:23 2020
        Raid Level : raid1
        Array Size : 488253440 (465.63 GiB 499.97 GB)
     Used Dev Size : 488253440 (465.63 GiB 499.97 GB)
      Raid Devices : 2
     Total Devices : 2
       Persistence : Superblock is persistent

     Intent Bitmap : Internal

       Update Time : Thu Oct 15 20:53:43 2020
             State : clean, resyncing
    Active Devices : 2
   Working Devices : 2
    Failed Devices : 0
     Spare Devices : 0

Consistency Policy : bitmap

     Resync Status : 0% complete

              Name : NCJ-nas:vol1  (local to host NCJ-nas)
              UUID : d76ec4f9:43bcb4e3:e578f7fe:b64e8e78
            Events : 4

    Number   Major   Minor   RaidDevice State
       0       8        1          0      active sync   /dev/sda1
       1       8       17          1      active sync   /dev/sdb1
pi@NCJ-nas:~ $
```

###Save the RAID Array
###Execute in the Super User command environment
___ pi@raspberrypi:$ sudo -i

___ pi@raspberrypi:$ mdadm (--)detail (--)scan >> /etc/mdadm/mdadm.conf

###Verify that the RAID array was correctly saved

___ pi@raspberrypi:$ tail /etc/mdadm/mdadm.conf

```
root@NCJ-nas:~# tail /etc/mdadm/mdadm.conf
# automatically tag new arrays as belonging to the local system
HOMEHOST <system>

# instruct the monitoring daemon where to send mail alerts
MAILADDR root

# definitions of existing MD arrays
ARRAY /dev/md/vol1  metadata=1.2 UUID=ccf1cc73:42a46e8c:9f2d4bcc:674bc95d name=NCJ-nas:vol1

# This configuration was auto-generated on Thu, 15 Oct 2020 20:48:04 -0400 by mkconf
```

___ pi@raspberrypi:$ exit

  ###Create the FS on the RAID array -   {~25 secs}
___ pi@raspberrypi:$ sudo mkfs.ext4 -v -m .1 -b 4096 -E stride=32,stripe-width=64 /dev/md/vol1

  ###Create the mount point for the array
___ pi@raspberrypi:$ sudo mount /dev/md/vol1 /mnt

___ pi@raspberrypi:$ sudo blkid

```
pi@NCJ-nas:~ $ sudo blkid
/dev/mmcblk0p1: LABEL_FATBOOT="boot" LABEL="boot" UUID="997C-A34A" TYPE="vfat" PARTUUID="0a999956-01"
/dev/mmcblk0p2: LABEL="rootfs" UUID="05c2c54d-f13e-4442-bf69-70e99c3d748d" TYPE="ext4" PARTUUID="0a999956-02"
/dev/sda1: UUID="d76ec4f9-43bc-b4e3-e578-f7feb64e8e78" UUID_SUB="893145ef-c3ab-fdbb-cccd-1aae9624b9b9" LABEL="NCJ-nas:vol1" TYP
E="linux_raid_member" PARTUUID="1c884902-2854-cb46-9cca-98c151dafa43"
/dev/sdb1: UUID="d76ec4f9-43bc-b4e3-e578-f7feb64e8e78" UUID_SUB="e1658472-9b34-51a6-1d61-94d4506470dc" LABEL="NCJ-nas:vol1" TYP
E="linux_raid_member" PARTUUID="9aa0f768-9253-2742-803f-7064f3881102"
/dev/md127: UUID="7c1e8565-3512-4c28-8a71-b9c97d134e9a" TYPE="ext4"
/dev/mmcblk0: PTUUID="0a999956" PTTYPE="dos"
```

The item we're after is the UUID of `/dev/md/vol1:` (*if your volume name doesn't show, it'll be called "md127" or similar, this is a bug in mdadm, but continue the guide using the name you gave your array*) which in my case is `394fd8f2-7b2a-474f-8e58-48b81a6ca8fb` but yours will be different. Highlight and copy the UUID and paste into a text editor, then add it to fstab and backup the original fstab just in case:

  ###
___ pi@raspberrypi:$ sudo cp /etc/fstab /etc/fstab.bak
___ pi@raspberrypi:$ sudo nano /etc/fstab

  ###Just before the bottom comments, enter:
UUID={Your UUID} /mnt ext4 defaults 0 0

  ###Save the file

  ###Setup permissions for user access
___ pi@raspberrypi:$ sudo chown -R pi:pi /mnt
___ pi@raspberrypi:$ sudo chgrp -R 0777 /mnt

###Setup SAMBA credentials
___ pi@raspberrypi:$ sudo smbpasswd -a pi

###You should see "Added User pi" in the output

###Need to configure the SAMBA file system
###Backup current config
___ pi@raspberrypi:$ sudo cp /etc/samba/smb.conf /etc/samba/smb.conf.bak

###Now edit the config file
___ pi@raspberrypi:$ sudo nano /etc/samba/smb.conf

###Scroll to the bottom and add:

NCJ NAS File Share
  [NAS]
  path = /mnt
  comment = RasPi NAS Share
  valid users = pi
  writable = yes
  browsable = yes
  create mask = 0777
  directory mask = 0777

###Save the file

###Print the status of the samba service. YOU should see "Loaded Services File OK"
___ pi@raspberrypi:$ testparm

```
pi@NCJ-nas:~ $ testparm
rlimit_max: increasing rlimit_max (1024) to minimum Windows limit (16384)
Load smb config files from /etc/samba/smb.conf
rlimit_max: increasing rlimit_max (1024) to minimum Windows limit (16384)
Processing section "[homes]"
Processing section "[printers]"
Processing section "[print$]"
Processing section "[NAS]"
Loaded services file OK.
Server role: ROLE_STANDALONE
```

###Restart the SAMBA Service
___ pi@raspberrypi:$ sudo systemctl restart smbd