Sans Digital ACM Configure Details

#1 - Be Patient.

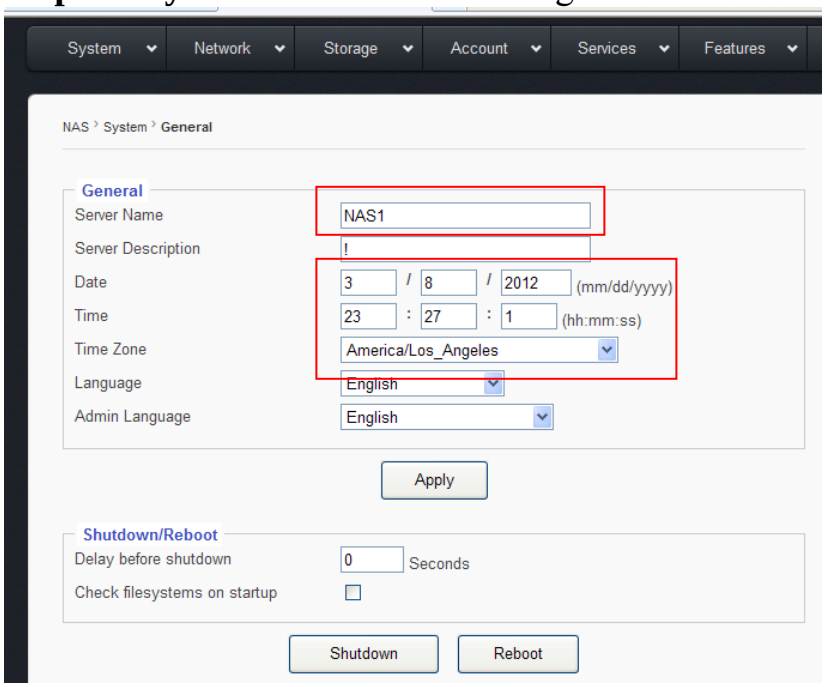
- ❖ It takes time to sync setting between Nodes and adding Nodes.
- ❖ It takes time to create filesystem for LV/Share
- ❖ It takes time to add Public IP

#2 - Plan Ahead.

- ❖ Names for the NAS – Server Name ?
- ❖ NIC Assignment – Name and IP, which is the Public and which is for Synchronization ?
- ❖ Volume Cache – Write-Back or Write-Through ?

Steps to Configuring Cluster

Step-1: "**System → General**" Settings.



(A): Set **Server Name**. In our example here, we name them as: "**NAS0**" and "**NAS1**".
or you can use name like "**n0**" / "**n1**" or "**node0**" / "**node1**".
Clustering starts the node from 'node-0', so try to make your naming scheme matche it to avoid confusion in the future.

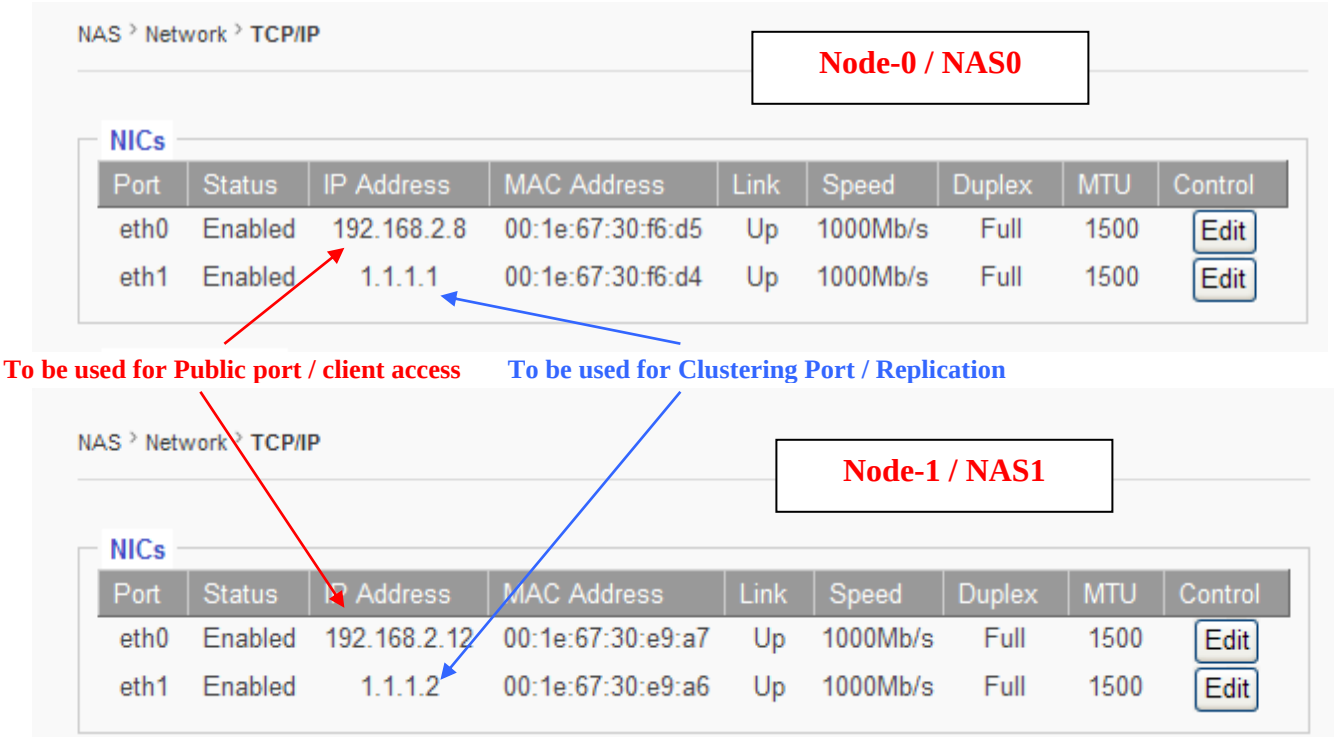
(B) Set the correct Date, Time, and Time Zone. for joining ADS domain will need these to be accurate.

Step-2: NIC Port IP Settings

Go "**Network → TCP/IP**" page:

On **Node-0** (**NAS0**):
Assign the static IP to eth0, this IP is going to be used for the Public port for client access.
Assign the static IP to eth1, this IP is going to be used for Clustering Port / Data Replication between two Nodes.

On **Node-1** (**NAS1**):
Assign the static IP to eth0, this IP is going to be used for the Public port for client access.
Assign the static IP to eth1, this IP is going to be used for Clustering Port / Data Replication between two Nodes.

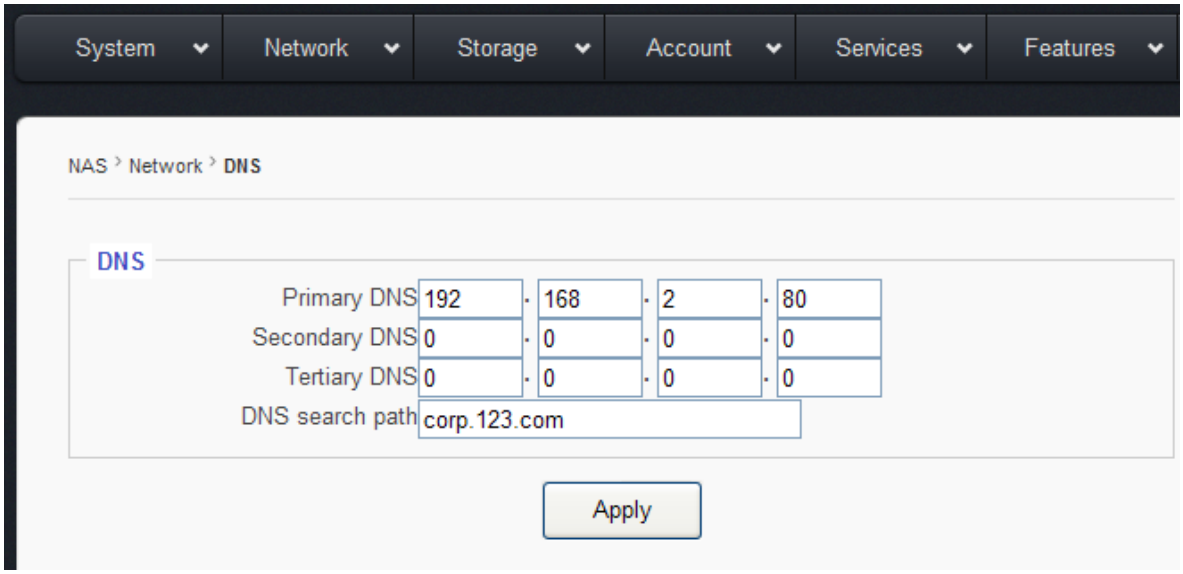


Step-3: DNS Setting

Go " **Network → DNS**" page.
Set DNS Server info according to your actual DNS server.
If you have 2nd and/or 3rd DNS server, fill in the info too.

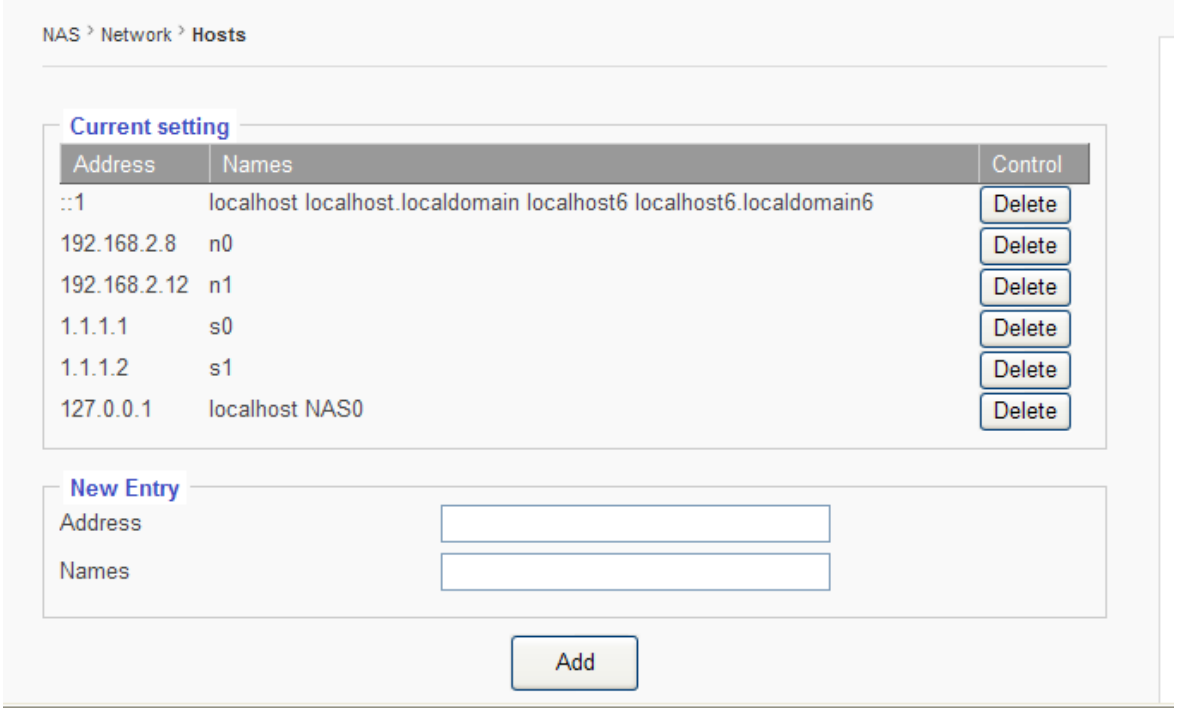
Both Nodes need to setup the DNS Server.

Remarks:
If your DNS Server is configured properly and working, you may not need to enter the DNS search path. But in the past, we have found many DNS servers out in the field were not properly configured. So, adding it here would be a like an insurance to guarantee no problem for later operations.



Step-4: Registering Hosts.

Go "**Network → Hosts**" page
Register the IP with associated host name.
The "**host name**" is defined by you for easy identification.



in our example here, we define:

n0 = 192.168.2.8 -- which is the eth0 on NAS0 (node0)
n1 = 192.168.2.12 – which is the eth0 on NAS1 (node1)
s0 = 1.1.1.1 – which is the eth1 on NAS0 to be the synchronization port.
s1 = 1.1.1.2 – which is the eth1 on NAS1 to be the synchronization port.

Both Nodes need to have the same hosts registrations.

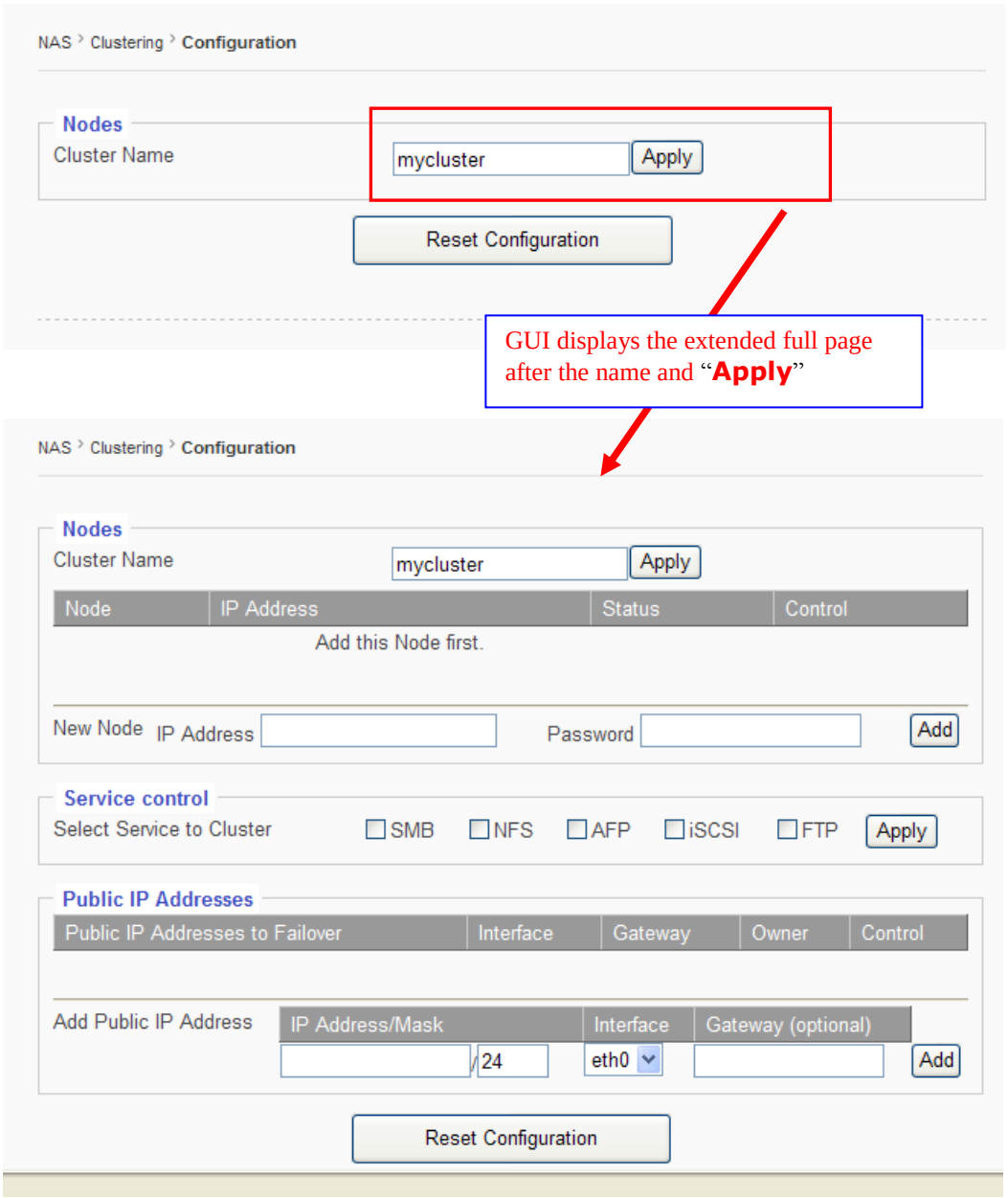
If no hosts registration, when performing Clustering set up, the GUI page might turn Black for a long while before it comes back to the GUI. When it goes Black screen, it is not dead, just that the NAS needs time to find all the nodes.

Remarks:
This step of hosts registration can be skipped if you have a properly configured and working DNS server. But in the past, we have found many DNS servers out in the field

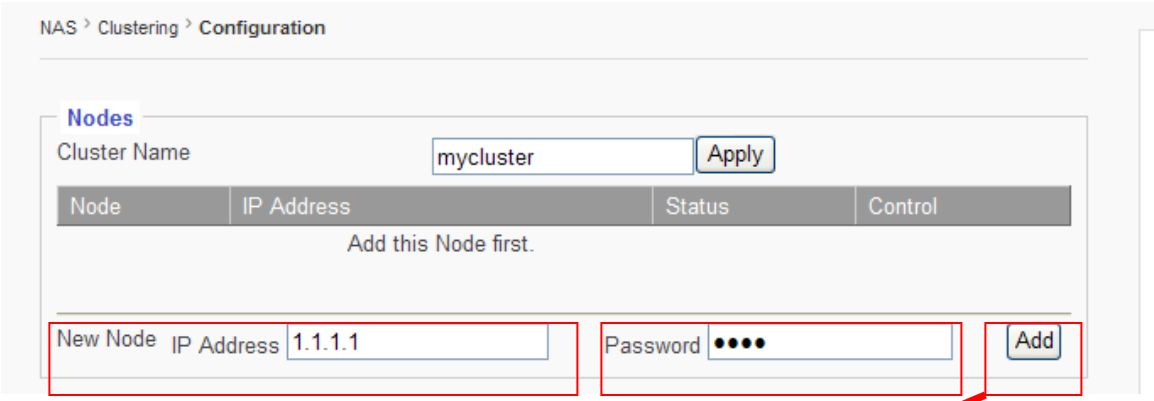
were not properly configured. So, registering hosts here would be a like an insurance to guarantee no problem for later operations.

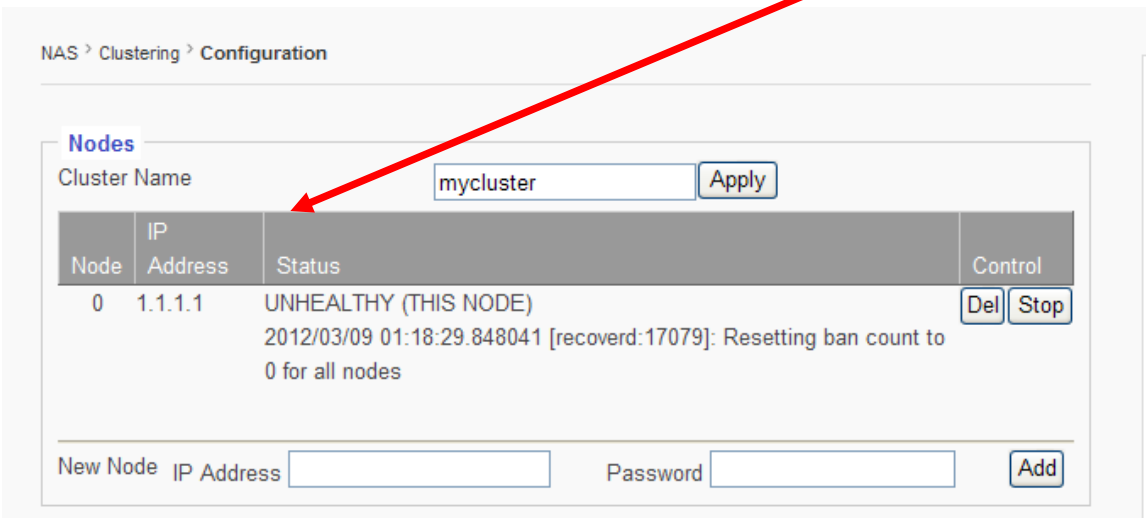
Step-5: Configuring the Cluster → Adding Nodes

From **NAS0/Node0**, Go "**Clustering → Configuration**", and give it a Name for the cluster and "**Apply**"



Now, add the **eth1 IP** of **NAS0/Node-0** itself.
This is the **s0** (**Synchronization** / **Replication** Port)
It might take a little bit of time before the GUI comes back from Black.
Be Patient





Remarks: No need to worry about the message in the "**Status**" field at this point. It is normal.

Now, stay at the same window from **NAS0/Node-0**, let's add the **eth1 IP** of **NAS1/Node-1**

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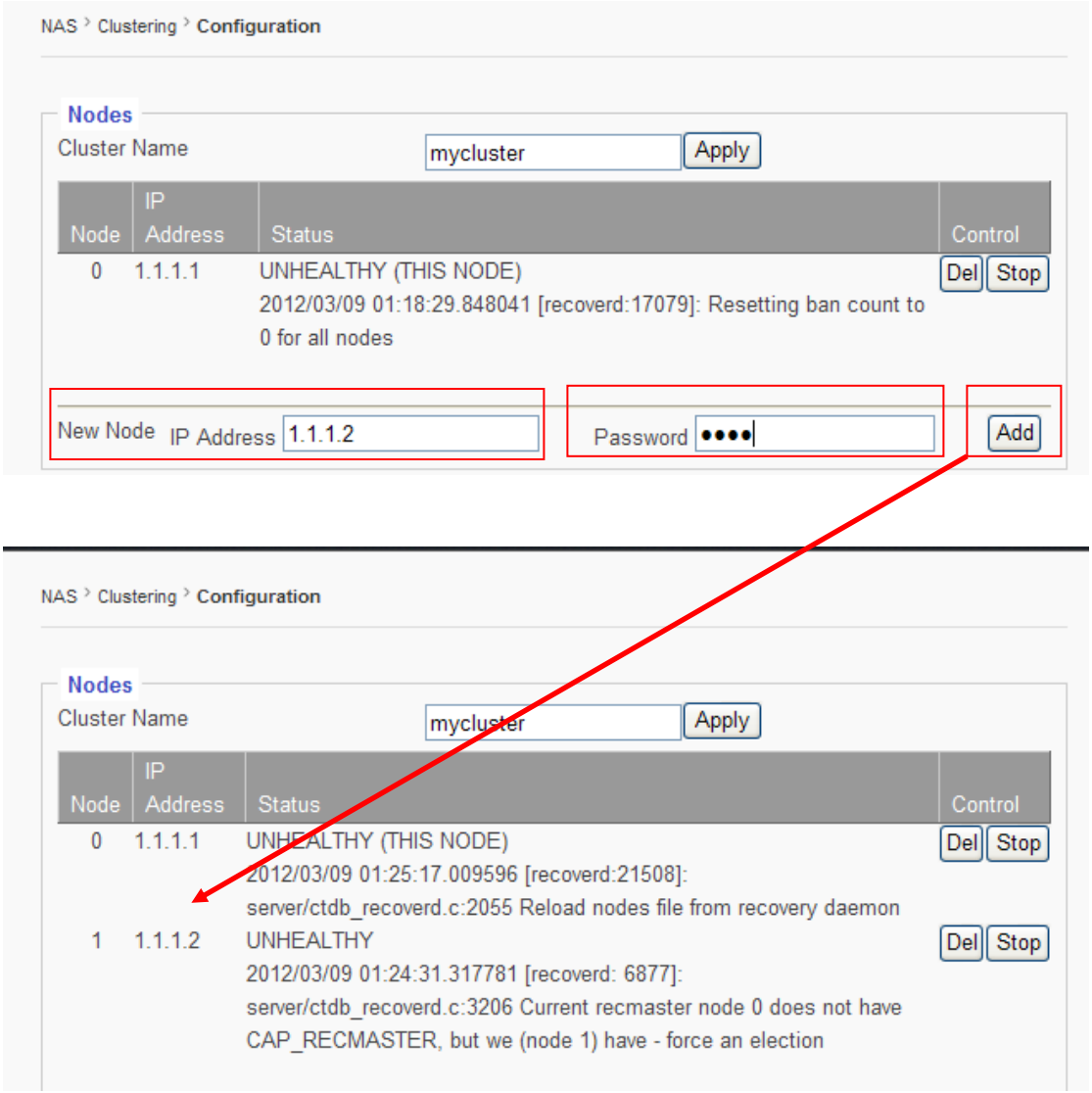
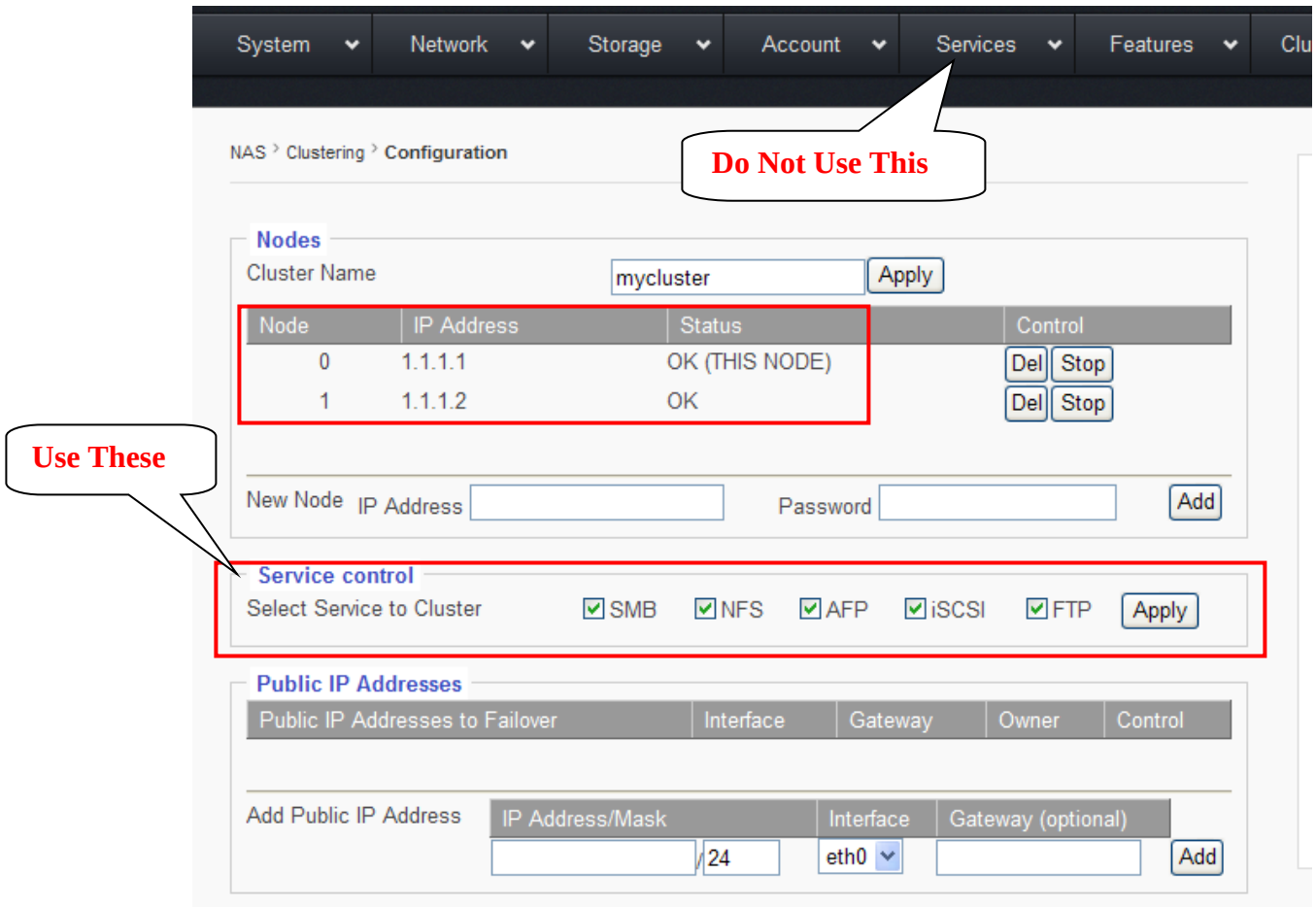
It might take a little bit of time before the GUI comes back from Black.
Be Patient



Remarks: Again, no need to worry about the message in the "**Status**" field at this point. It is normal.

Step-6: Configuring the Cluster → Select Services

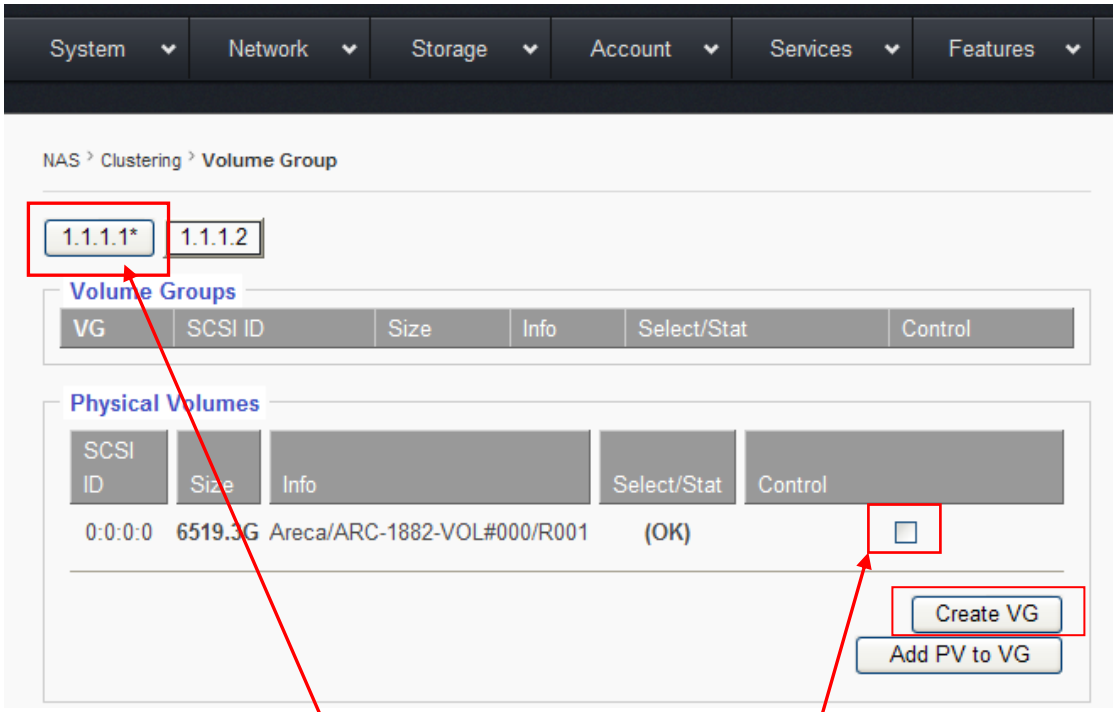
Now, stay at the same page "**Clustering**" on **NAS0/Node0**, and let's enable **Services** that is to be "clustered" for **Failover**.



Remarks:
For **Cluster mode**, all the **Services** are to be controlled in the **Clustering** page here for **turn-on/turn-off** instead of the pages in "**Services**" top menu.

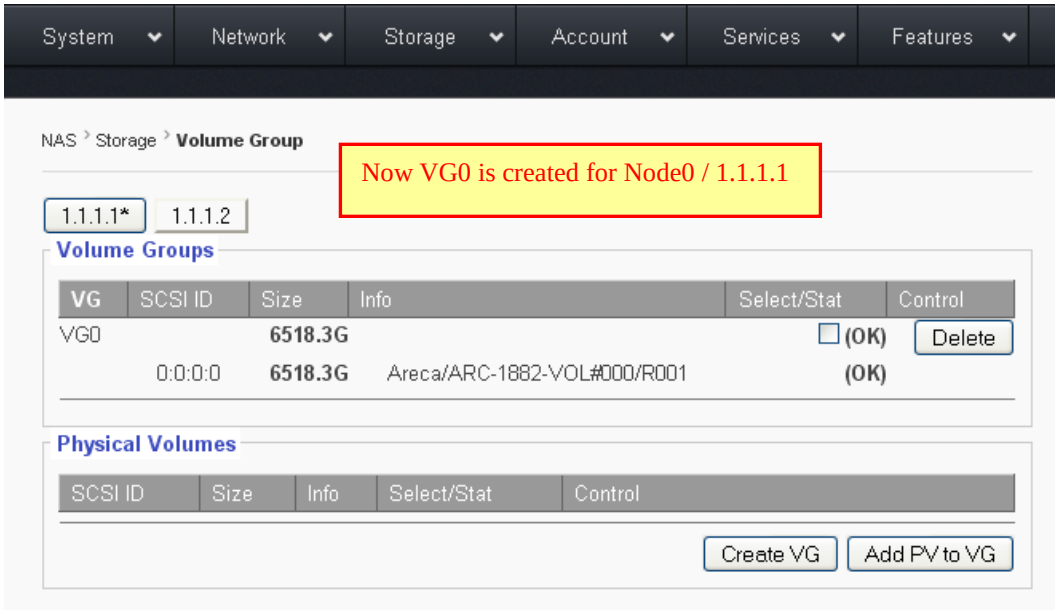
Step-7: Configuring the Cluster → Create VGs for Cluster on Both Nodes

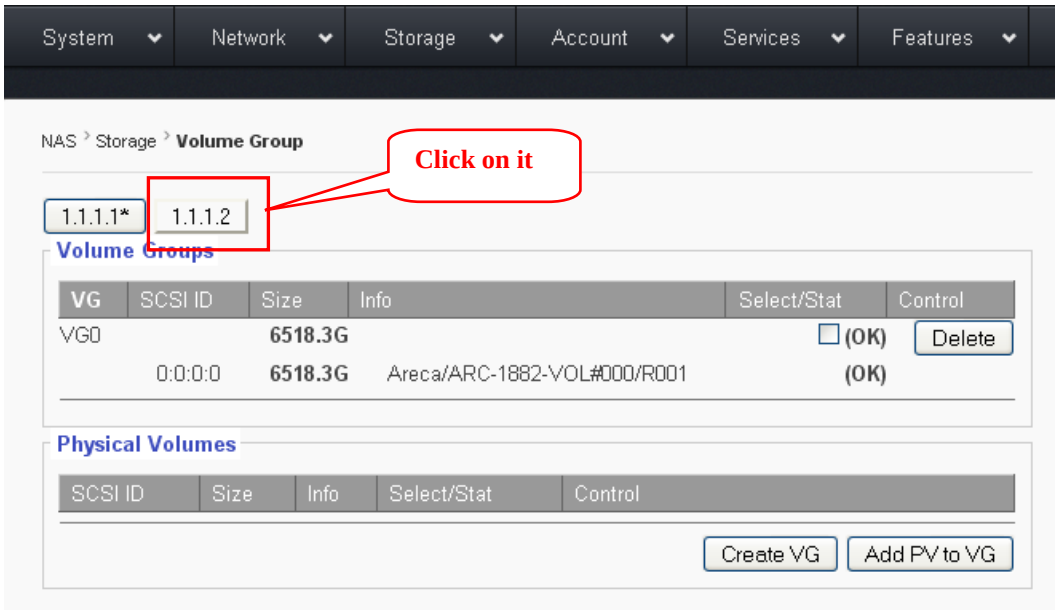
Stay with **NAS0/Node0**, go "**Clustering → Volume Group**"



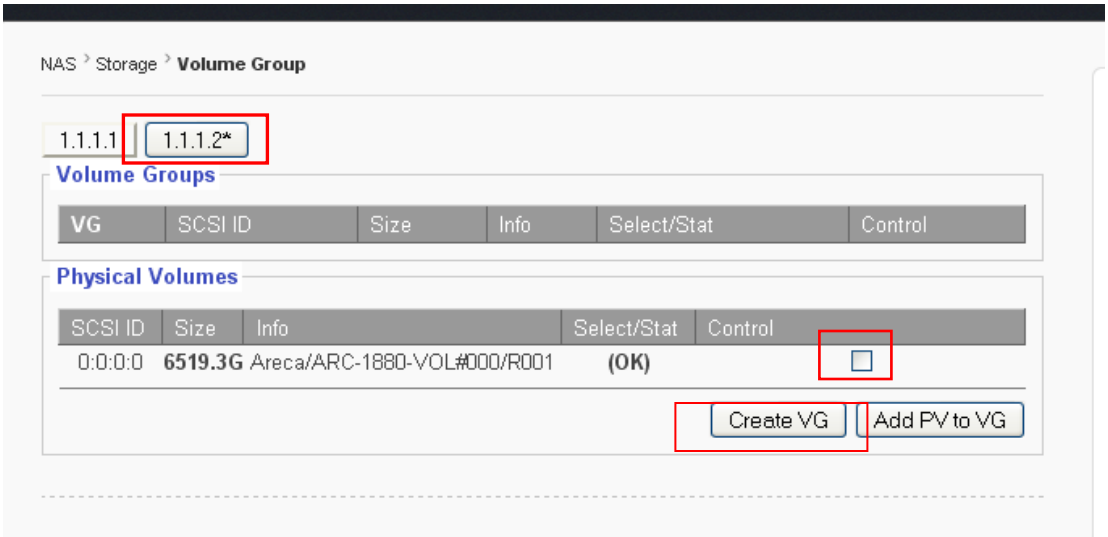
In a single page, the GUI displays both Nodes' Volume Group info.
The current select node has an "*****" after the IP to indicate it is the selected one.
In the above picture, IP: **1.1.1.1*** is the current selected node.

No, select the **Physical Volume** by check-marking the "**Control**" box, then click "**Create VG**" button to create Volume Group from the PV.





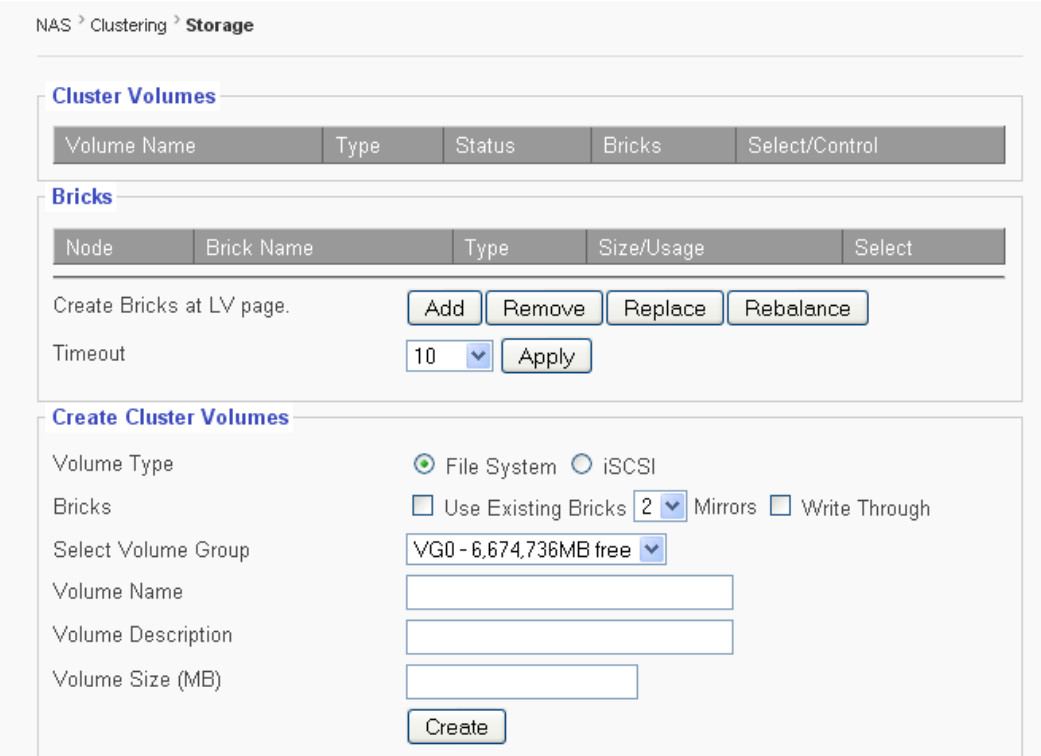
Now, let's switch to Node1 / 1.1.1.2 and do the VG creation.
To switch to Node1 / 1.1.1.2, just click on the tag: **1.1.1.2**
and notice the IP 1.1.1.2 now has the "*****" to indicate it is selected.
Just do the same thing to create VG for Node1 / 1.1.1.2



Warnings:
VGs MUST be the same size from both Nodes !

Step-8: Configuring the Cluster → Create Clustered LV

Go **"Clustering → Storage"** page to create Clustered Logical Volume (LV)



Warnings:

There are many functions and features in this page.
But for now, we are only supporting what are listed and guided below.

Volume Type:

File-System: when selected, the LV is using **EXT4** as file system, and what you are created is to be a network share.

iSCSI: when selected, it is going to be an iSCSI target volume. For now, the iSCSI for clustering is still under debugging.

Bricks: For now we do not support any of its options here except the **Write Through**.
Write Through – by default, all LVs (network share or iSCSI target) are created to be **Write-Back** mode. By check-marking this "Write-Through" option, the LV is created to be **Write-Through** mode. *The LV mode is not changeable or interchangeable once a LV is created.*

"**Write-Back**" mode gives better Write performance, while it have the risk of losing data in the cache if any thing happens, such as power outage, system locked up, etc.
On the other hand, "**Write-Through**" gives better Data Safety/Integrity, but the Write performance is significantly slower.

Disclaimer: Which mode to be used is purely up to the users based on their own judgment for the nature of their applications. We are not responsible for data lost whatsoever if the user picks one method over the other. We are simply laying out the facts here, and we are not suggesting one method over the other.

Here are some basic numbers:

Over 1Gb Ethernet

"Write Back" = ~ 80 ~ 90+MB/sec sequential Write.
"Write Through = ~ 36MB/sec sequential Write.

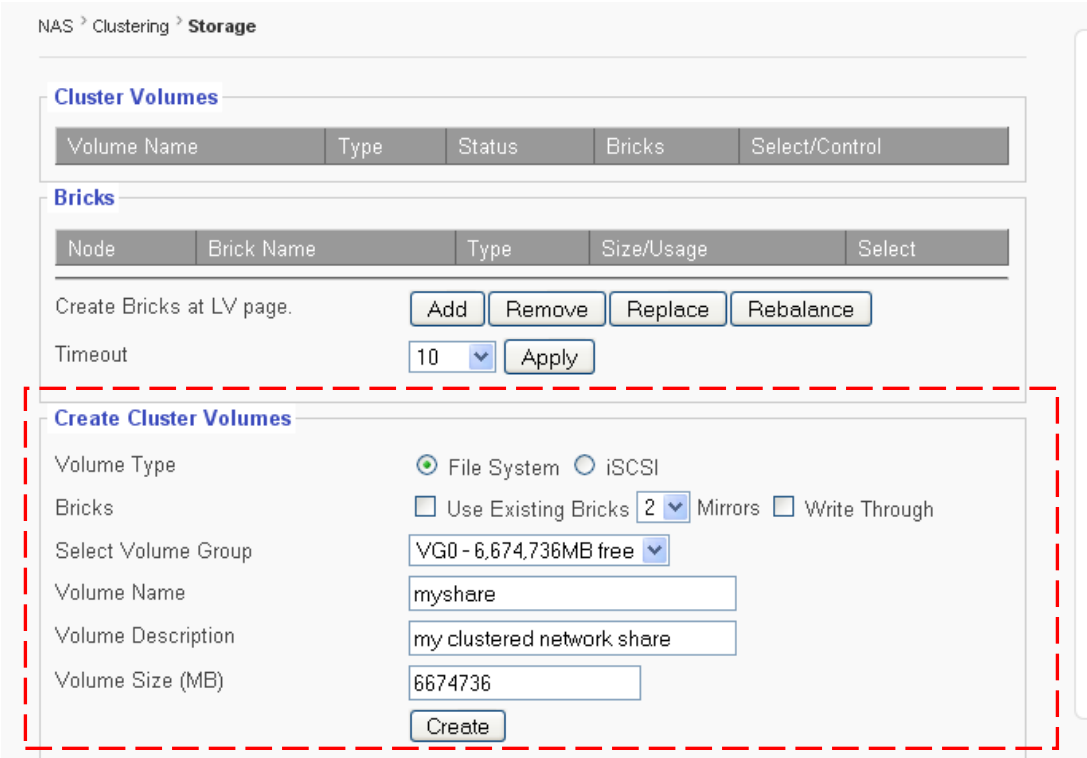
Over 10Gb Ethernet

"Write Back" = 500+MB/sec sequential Write, or whatever the internal RAID system permits.
"Write Through" = ~ 100+MB/sec sequential Write, regardless how fast the internal RAID system may go.

Select Volume Group.

Here it displays what VG is available to create the LV from. If there is more than 1 VG, scroll down the window the select the desired VG.

Now, after select the VG, give the LV a '**name**' and assign the size to it, then click "**Create**" button.



Remarks:

- **If you get an error at this point**:

  If you get an error now at this point, it is most likely; you forgot to create another VG in one of the Nodes. Please go back the pages to check if both Nodes have equal number of VGs created with equal size.

- **Time needed to Create EXT4 network share / LV**

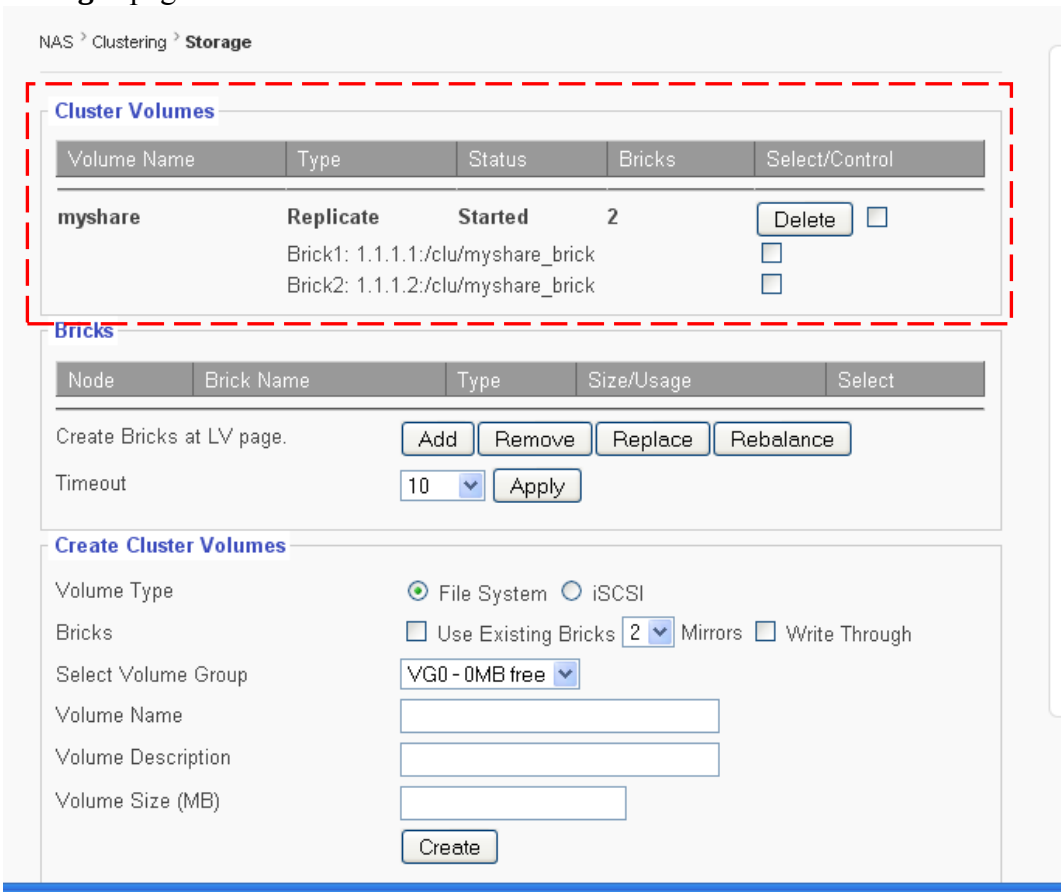
  EXT4 file system takes time to create, and it is almost linearly proportional to the size of the LV. In this example, 6.6TB takes about 13 minutes and 18 seconds to finish.
  (**6.6TB = ~ 00:13:18**)

  During the **EXT4** file system creation, the GUI screen is black and blank, but no need to panic; it will come back after the **EXT4** file system creation is done.

- **Time needed to Create iSCSI Target LV**

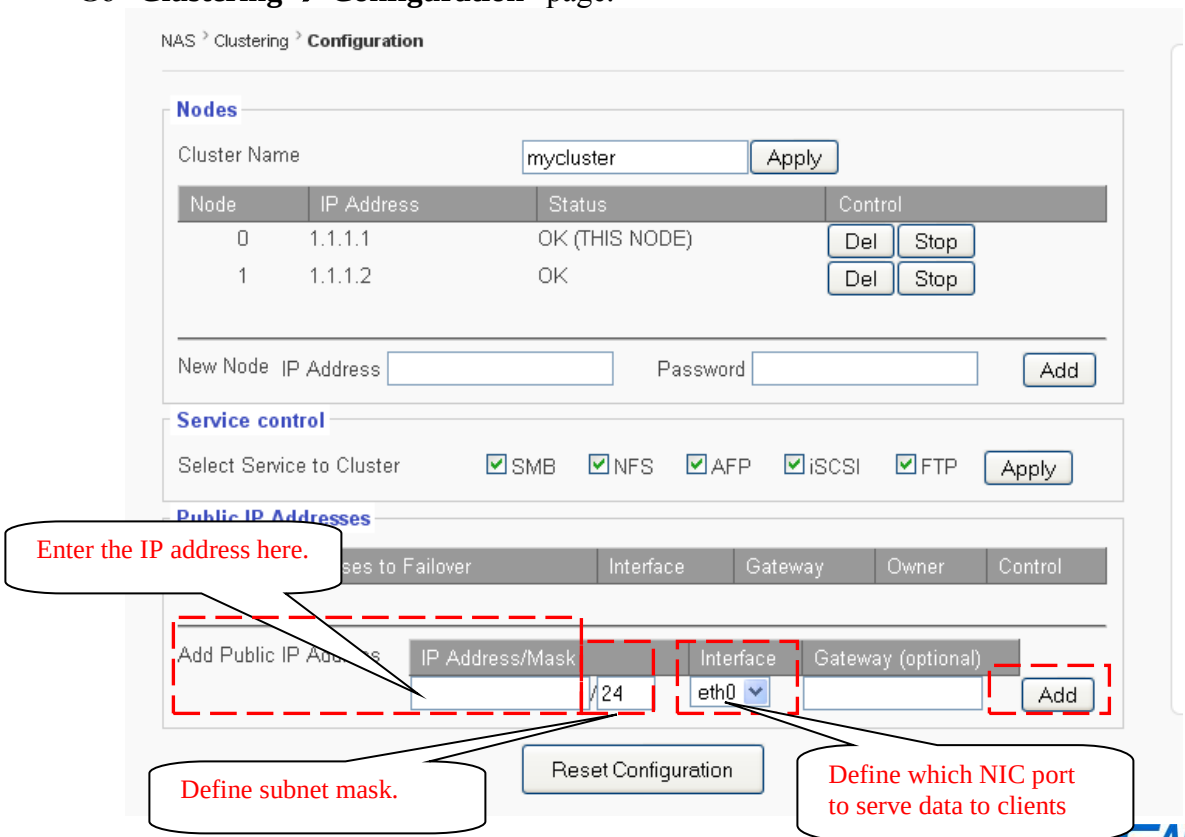
  iSCSI target volume also takes time to create too, but we have found it not to be linearly proportional to the size of the iSCSI target.

This is how it looks after the EXT4 network share / LV created in the "**Clustering → Storage**" page.

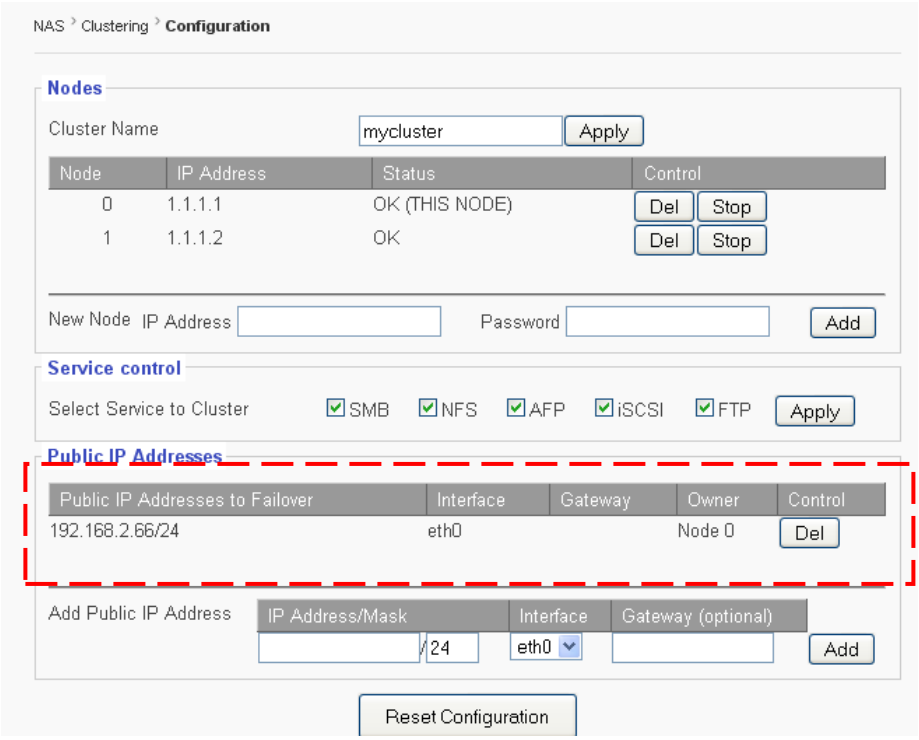


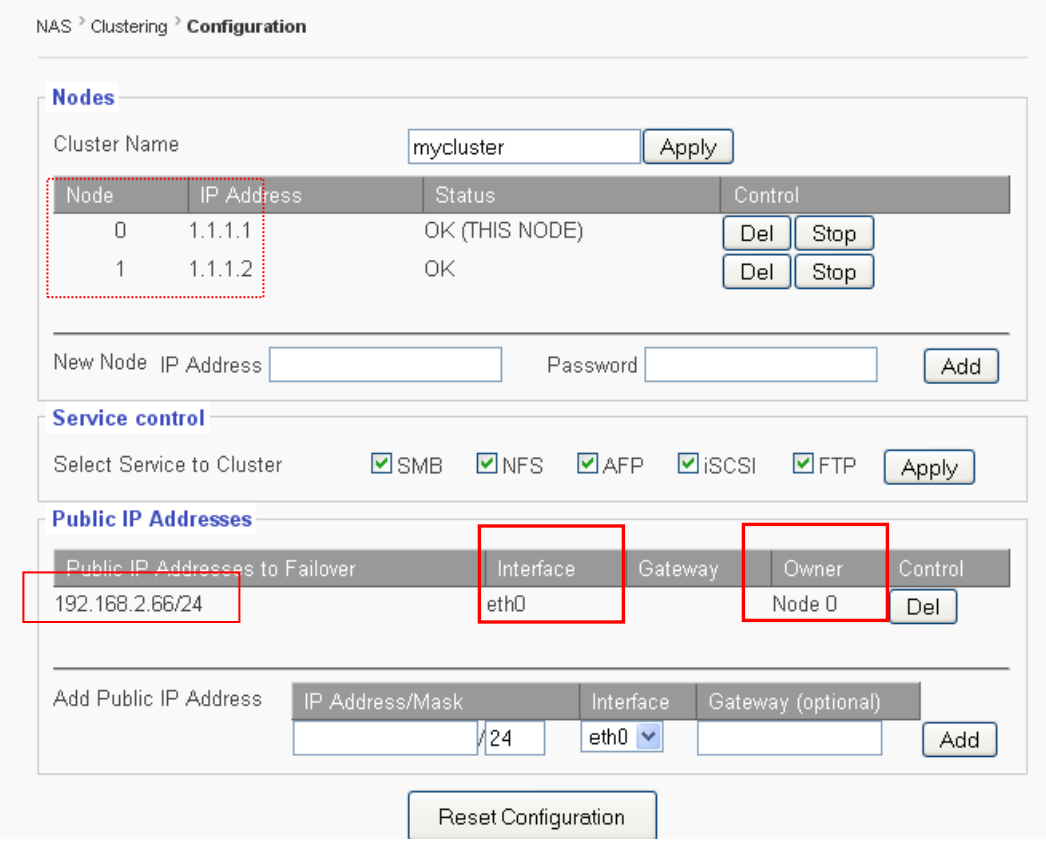
Step-9: Configuring the Cluster → Creating Public IPs

Go "**Clustering → Configuration**" page.



Do NOT click Refresh button on the Web Browser !!!
It will take a little bit time for GUI to Come Back, Just Be Patient





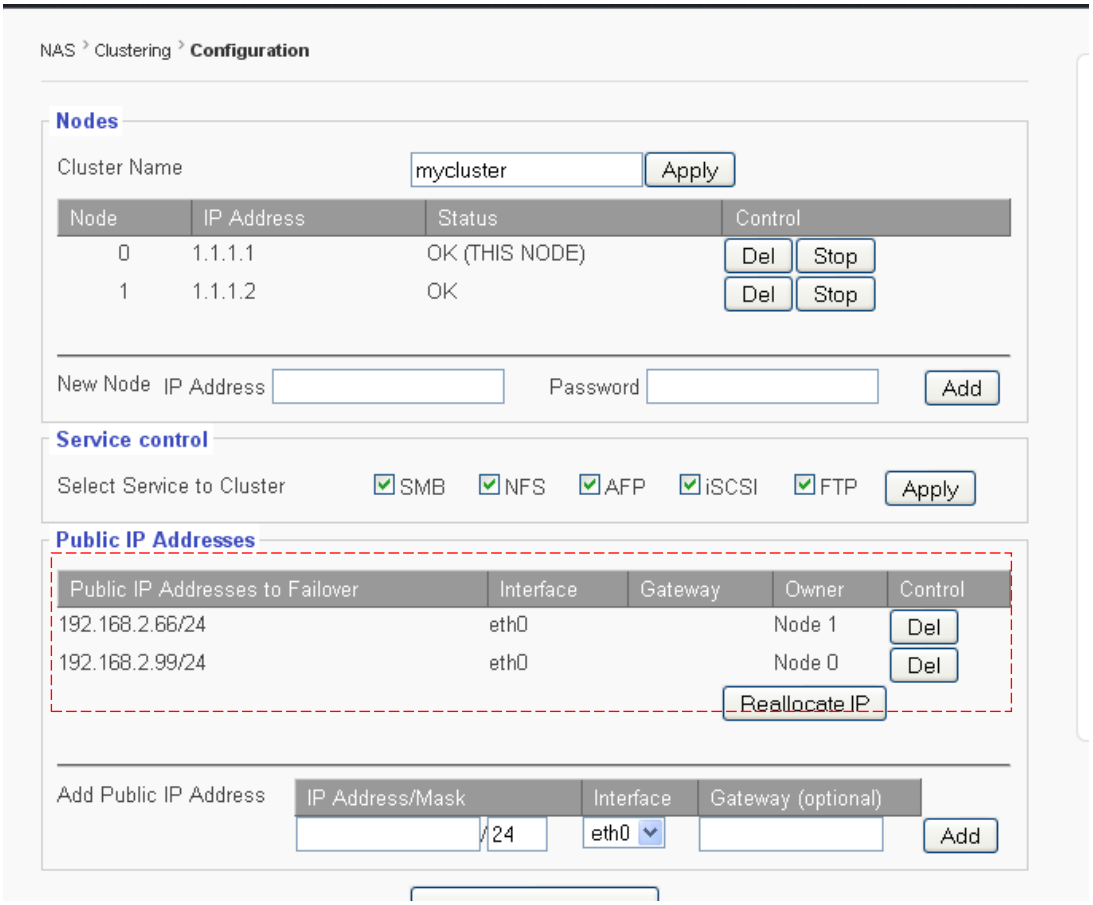
"**Public IP Address**" – it is the service IP that all network clients will be mapped to and accessing from/to. The "**/xx**" defines the subnet mask. "**24**" = 255.255.255.0

"**Interface**" – it is the NIC port on each node that selected to be the actual network port that will be serving data underneath the virtual "**Public IP**". Both Nodes should be using the same **ethX / nicX**; and these ethX/nicX should have been assigned with a static IP in the beginning before configuring the **Cluster**.

"**Owner**" – that means, the **Node-0** (1.1.1.1 / 192.168.2.8) will own the **Public IP** in normal operation. All Write operations will write to the **Node-0** / **eth0** first, then, from **Node-0**, data will synchronize to **Node-1** via the dedicated ports 1.1.1.1 and 1.1.1.2.

For all the Read operations, clients will read from **Node-0** via eth0 only.
When **Node-0** Fails, **Node-1** will automatically become the owner of the **Public IP**, and operations will failover to **Node-1**.

This configuration is called: "**Active / Standby**" clustering configuration. The **Node-0** is **Active** and **Node-1** is "**Standby**".



Now, notice there are two **Public IP**s and each has a different owner, one by **Node-0** and the other by **Node-1**.

192.168.2.66 – owned by Node-1
192.168.2.99 – owned by Node-0

This configuration is called "**Active/Active**" clustering configuration, it achieves the purpose of "**Static Load-Balancing**" while it is also the **Mirroring** and **Failover** clustering. Now, you can assign some of the network clients to access one **Public IP** (**192.168.2.66**), and some other clients to access the other **Public IP** (**192.168.2.99**).

In **Active/Active** mode, if clients are accessing both Nodes, the Write performance is better than writing to a single Node, and the Read performance is nearly double of reading from a single Node, because now clients are indeed reading from two Nodes.

If users prefer and know how to configure a **Round-Robin DNS Server**, and all network clients can access a single **Virtual IP** provided by the **DNS Server**, but actually accessing these two **Public IPs** in a **Round-Robin Load-Balancing** method.

Disclaimer: How to setup a Round-Robin DNS Server is not our responsibility. Users are the sole party taking on the risk and responsibility for setting /configuring / maintaining the DNS Server.

Step-10: Creating Local Users / Groups

If local users are to be used, now create the local user accounts.
Go "**Account – Local User**" page, and create local users.

Only need to create Local User on one Node.
All local users accounts created from a node in an existing cluster will be synced to all other nodes in the cluster.

Also create Local User Groups here if necessary.

Step-11: Join ADS for ADS Users/Groups

If **ADS** is to be used, now join the **ADS** from each node.
Go "**Account – ADS**" page, fill in necessary info and perform the join action.

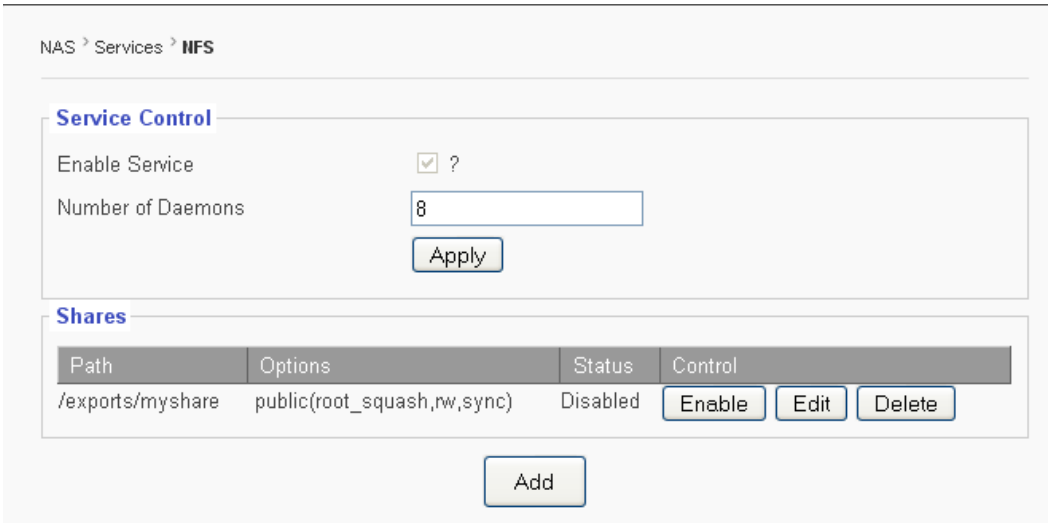
Each Node Must perform the same Join action. ***ADS users/groups will not be synchronized between Nodes in the cluster.***

Step-12: Services – NFS for LVs

By default, all and any LV/share, when created, is automatically enabled for SMB/CIFS access. But LV/share is not automatically enabled for NFS access. So if a LV/share is intended to allow NFS client accessing, then, user needs to manually turn on the NFS service for the LV/share.

"Clustering → Configuration" → NFS Service = Enable/Disable NFS Service for the Node/Cluster.
"Services → NFS" = Enable/Disable NFS access to the LV/Share

Go "**Services → NFS**" page, click on the "**Enable**" button, then click on the "**Edit**" button to edit the access permission for the LV/share.



NFS service for LV/share and permission setting on one Node in the cluster will get synced to all Nodes in the cluster.

Step-13: SMB/CIFS & Access-Control – for LVs and Folders.

Go "**Services → SMB/CIFS**" page to assign basic permission to the LVs(Shares).
Go "**Services → Access Control**" page to assign detail permission to folders / subfolders.

Settings done on one Node will be synced to all Nodes in the cluster.

Here is the Summary for what synces and what don't sync:

Pre-Condition: In An Existing Cluster	
Services / Actions	**Synced to All Nodes in a Cluster**
Service Control – Selected Services to be Clustered: SMB/NFS/AFP/iSCSI/FTP (in clustering -> configuration page)	Yes, will synced to all nodes
Create Cluster Volume – (in clustering -> storage page)	Yes, will synced to all nodes
Create Public IP – (in clustering -> configuration page)	Yes, will synced to all nodes
Create Local User / Group	Yes, will synced to all nodes
SMB/CIFS Enable/Disable for LV/share	Yes, will synced to all nodes
SMB/CIFS Permission Setting	Yes, will synced to all nodes
NFS Enable/Disable for LV/share	Yes, will synced to all nodes
NFS Permission Setting	Yes, will synced to all nodes
Access Control – Permission Setting	Yes, will synced to all nodes
Join ADS	No! need to join from each node
Creating VG	No! need to create from each node

Now, you are ready to have some fun, configuring and testing the Failover.