MIECT: Integrated Management of Networks and Services 2011-12

Practical Exercise: RAID, NAS and SAN

Duration: v1.0

1 Objective

Understand the differences between NAS and SAN architectures and related protocols. Understand the benefits and drawbacks of the different RAID levels.

2 Guidelines

2.1 Prepare Environment

This guide will focus in the creation of several RAID volumes in a NAS/SAN software, and export filesystems and targets to other external machines.
Using the "VirtualBox" software present in the in the laboratory desktops, create a guest with 512MB RAM and 5 hard disks. The first should have 1GB and will be used for the NAS software. The remaining 4 disks should have 1GB and will be used as redundant storage devices.
If possible, install the VirtualBox guest additions.
This will enable the support for Para-virtualization and greatly improve IO performance.

Install the latest version of the OpenFiler NAS/SAN Appliance in the first disk of the guest.

After the software is installed, a HTTPS interface is available in port 446.

2.2 RAID

The objective of this step is to evaluate the different RAID levels and the resulting arrays.

Create different RAID volumes using the 4 additional disks and compare the space available in each case. Possible RAID levels with this configuration are 0, 1, 10, 5 and 6 (we will ignore level 4).

You can make use of the following take to take notes.

	RAID Level	Space Available	Number of Failures allowed
2 DSK	0	2GB	0
2 DSK	1	1023.44MB	1 (N-1)
4 DSK	10	2GB	N/2
3 DSK	5	2GB	1
4 DSK	6	2GB	1

2.3 NAS/SAN

Delete the previously created RAID arrays and create a RAID level 0 array.

Using the Openfiler web interface, create 1 volume group in the RAID array named vg0. Inside you can create volumes, which can be exported to remote hosts as storage mediums.

Create 1 block (iSCSI) volume and 2 other with an `ext3` filesystem. Export the `ext3` through NFS and CIFS.

Using VirtualBox in another physical host connected to the NAS/SAN directly through the Ethernet card, install a guest Linux and access the remote volumes. Test the performance of all volumes using `iozone` or `bonnie++`. Verify the impact of using Block based IO of File based IO in the iSCSI target.

You may try the different authentication and authorization options available.

Keep all images created as they will be used for the next projects!