Universidad
Rey Juan Carlos

Master in Free Libre Open Source Software

FℓOSS HA cluster for Netnovation's ZCS

Master Thesis

Author - Daniel Gámez
Tutor - Dr. Gregorio Robles

Problem Statement

- Business continuity, fault tolerant systems
- Cloud Computing Services (ZCS)
- Meet Service Level Agreements (SLAs)

Justification/Motivation

- Give credit to business models based on FℓOSS
  - Netnovation: Product Specialists, Hosting Providers

- Show that private enterprise can be benefited by FℓOSS

FreeNAS

And many other: LDAP, BIND, Postfix, OpenSSL, ClamAV, KVM, OpenVZ, OpenVPN, etc.

Overall Objectives

- Frame the FℓOSS business model used by Netnovation
- Show various current alternatives provided by FℓOSS at enterprise level
- Adapt the proposed solution to the guidelines established by Netnovation
- Establish an initial reference point for implementing HA private cloud services offered by Netnovation

Specific Objectives

- Implement a FℓOSS HA cluster for Netnovation's ZCS
- Perform tests in a controlled laboratory environment in order to promote it to production
- Describe the methodology used for the selection of the solution, as well as the process to be implemented

Scope

- The solution is not intended to replace the elements of the existing operations platform
  - Seeks the adaptation to the current infrastructure
- Used methodology is not intended to provide an exhaustive process that considers all possibilities in the area
  - Seeks a flexible way to classify available solutions, justifying their choice through concrete models and metrics
- Serves as an starting point for providing high availability to other enterprise systems in the company
  - Configurations of other systems are not covered in this exercise

Related Technologies

- Commercial Enterprise Cluster Software
  - HP Serviceguard (proprietary/*open core*)
  - Red Hat Cluster Suite (Linux-HA GPL/LGPL)
  - SUSE Linux Enterprise HA Extension (GPL/LGPL)

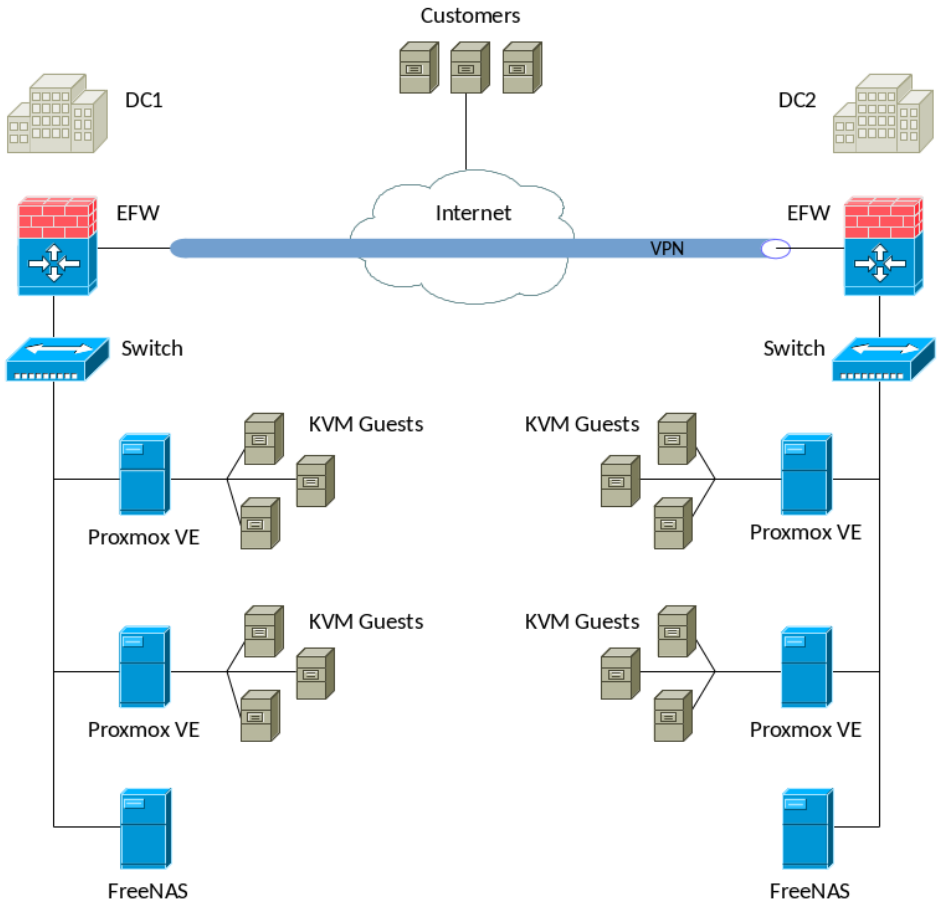
- HA FℓOSS based tools
  - Heartbeat $>$ Pacemaker (Linux-HA GPL/LGPL)
  - OpenAIS (Artistic License) $>$ Corosync (BSD)
  - DRBD (GPL), GFS (GPL), OCFS (GPL)
  - HAProxy (GPL), and many others

Methodology

- The SME guide to OSS by Carlo Daffara
- Lazy User Model (model of technology acceptance)
- Metrics Grimoire (data-mining toolsets)

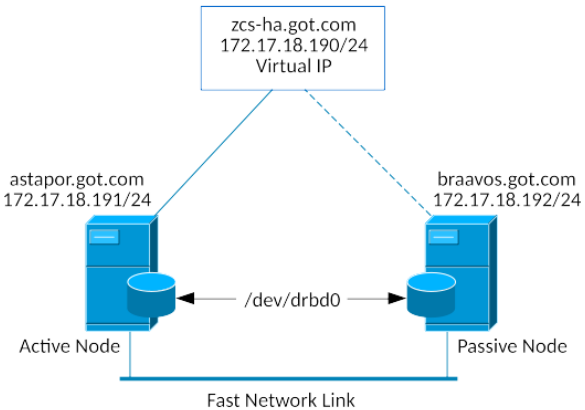
Netnovation's Architecture

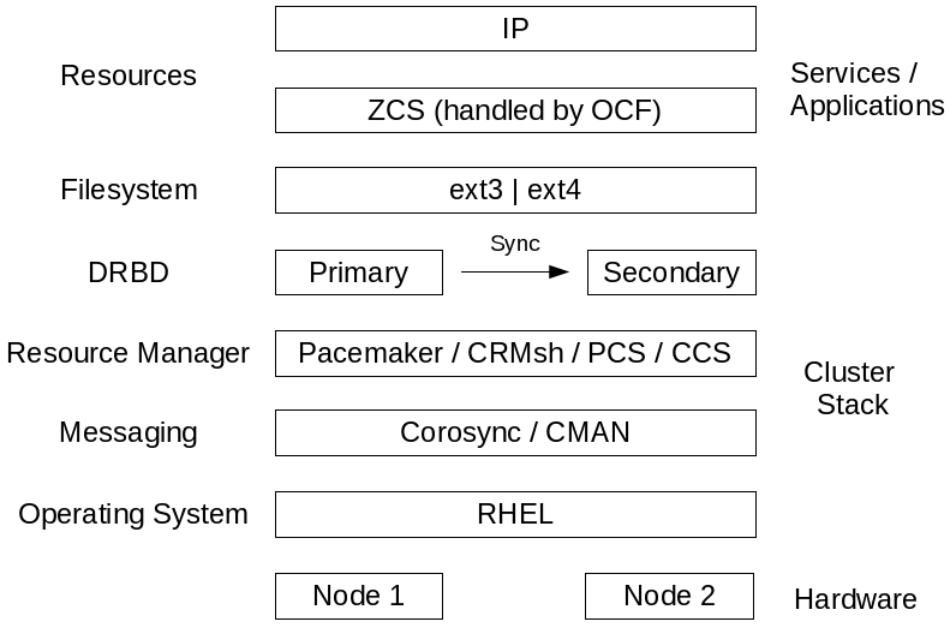
- Infrastructure
- Network Scheme
- Supporting Software:
  - UTM EFW
  - ProxmoxVE
  - FreeNAS
  - Zabbix



Implementation

- Key software elements
- Technological background





Technologies Stack

Results

- Research over the Internet, including sources such as FLOSSMetrics
- Most of the related projects were currently hosted in GitHub
- Since desired solution was enterprise-oriented, focused on a GNU/Linux distribution, main targets were RHEL and SLES
- A lot of documentation available for selected technologies (hard to merge)
- Metric Grimoire allowed to obtain metrics about selected projects and make some analysis
- Methods suggested by Daffara were aptly complemented by LUM

Conclusions and future work - I

- Implications about adopting a cloud infrastructure should be considered (benefits and side effects)
- Use of correct technologies directly impact over business continuity
- Companies nowadays demand agile decisions at adopting new technologies
- Within the significance and contribution of this research are:
  - An actual solution for the stated problem has been provided
  - Current implementation serves as a reference point for further deployments
  - FℓOSS standalone tools are an alternative to enterprise solutions, depending on many factors

Conclusions and future work - II

- For a more comprehensive analysis other tools can be used:
  - OpenBRR, QSoS, QualOSS, OSMM
- Other FℓOSS technologies to considerate in order to provide HA for similar environments are:
  - OpenStack, Cloudstack, Eucalyptus, OpenNebula, Docker, among many others

Closure / Questions and Answers

Many thanks for your attention.

All content of this work can be found in the following repository:
https://github.com/gamezdaniel/TFM.git