

OSS Case Study

LAN-Proxy

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Type of solution:

Infrastructure

Agency Background

Malaysian Meteorological Department (MMD) is an agency under Ministry of Science, Technology and Innovation (MOSTI). Located in Petaling Jaya, Selangor. MMD has 6 Regional Meteorological Office (RMO), each in Bayan Lepas Pulau Pinang, Butterworth Pulau Pinang, Kuantan Pahang, Gong Kedak Kelantan, Kota Kinabalu Sabah and Kuching Sarawak. MMD also has 39 Auxiliary Weather Station (AWS) nationwide. All the RMO's and AWS's need to connect to head quarters for meteorological data sending and also accessing internal meteorological applications.

MMD Objectives

To provide meteorological and seismological services for:

- safe and efficient operation in air, on land and at sea
- the military
- homeland security (such as natural disaster management, threats from climate change, extreme weather, earthquake and tsunami)
- public safety and comfort
- social economic development planning and environmental management

To observe and archive meteorological and seismological data to meet the needs of present and future generations.

To fulfill international obligations and to promote the understanding and advancement of meteorological, seismological and tsunami sciences.

Principle Objectives of the Project

Main objectives of the project is to create an office local area network that's connect to Internet through oss proxy with dual Internet connection for continuously connectivity. Some of the application being used such as shorewall, squid, dansguardian, ftp service and DNS service. All the client will point to the LAN proxy as the gateway. The Internet connection being used are Jaring leased line and also streamyx enterprise package. Both line are used as a backup for each other. If both line are up, Jaring leased line only used for operational and connection to headquarters while streamyx line used for internet access activities. If Jaring leased line down, all connectivity will used streamyx line and also the other way around. Connection status being checked automatically using cronjob.

Key Partners

ICT Division, Malaysian Meteorological Department

Plan and implement the solution and best practices can be done in Regional Forecast Office so that all the computer connected thru one dedicated lan proxy and all access are filtered accordingly and also ensure that the connection to headquarters and Internet are always established using two Internet connection (leased line and streamyx).

Regional Forecast Office (RMO)

Implementation location for the project The infrastructure solution was developed to meet their needs for continuously accessing head quarters internal meteorological application for data sending, forecasting and other related activities. Accessibility to access these application are crucial as weather forecast are needed for all aviation activities and also weather prediction. Weather data need to be sent to headquarters in hourly period,

therefore, Internet connection is very important. With the implementation of real time data system, data are more frequently need to be sent as every seconds per data. Internet connection is a must. Six (6) Regional Forecast Office involved throughout Malaysia. In the future, all the Auxiliary Weather Station may adopt the same infrastructure that has been established.

Primary OSS Technologies

Shorewall, Squid , Dansguardian were the primary OSS technologies used in this project and chosen due to popularity and ease of configuration and deployment.

Shorewall

The Shoreline Firewall, more commonly known as "Shorewall", is a high-level tool for configuring Netfilter. You describe your firewall/gateway requirements using entries in a set of configuration files. Shorewall reads those configuration files and with the help of the iptables utility, Shorewall configures Netfilter to match your requirements. Shorewall can be used on a dedicated firewall system, a multi-function gateway/router/server or on a standalone GNU/Linux system. Shorewall does not use Netfilter's ipchains compatibility mode; as a consequence, Shorewall can take advantage of Netfilter's connection state tracking capabilities to create a stateful firewall.

Squid

Squid is a caching proxy for the Web supporting HTTP, HTTPS, FTP, and more. It reduces bandwidth and improves response times by caching and reusing frequently-requested web pages. Squid has extensive access controls and makes a great server accelerator. It runs on Unix and Windows and is licensed under the GNU GPL.

Squid is used by hundreds of Internet Providers world-wide to provide their users with the best possible web access. Squid optimises the data flow between client and server to improve performance and caches frequently-used content to save bandwidth. Squid can also route content requests to servers in a wide variety of ways to build cache server hierarchies which optimise network throughput.

Thousands of web-sites around the Internet use Squid to drastically increase their content delivery. Squid can reduce your server load and improve delivery speeds to clients. Squid can also be used to deliver content from around the world - copying only the content being used, rather than inefficiently copying everything. Finally, Squid's advanced content routing configuration allows you to build content clusters to route and load balance requests via a variety of web servers.

Dansguardian

DansGuardian is an award winning Open Source web content filter which currently runs on Linux, FreeBSD, OpenBSD, NetBSD, Mac OS X, HP-UX, and Solaris. It filters the actual content of pages based on many methods including phrase matching, PICS filtering and URL filtering. It does not purely filter based on a banned list of sites like lesser totally commercial filters.

DansGuardian is designed to be completely flexible and allows you to tailor the filtering to your exact needs. It can be as draconian or as unobstructive as you want. The default settings are geared towards what a primary school might want but DansGuardian puts you in control of what you want to block.

DansGuardian is a *true* web content filter.

Design specifications

The design specification can be divided into 3 parts.

- Clients

The clients can be in any operating system. All the client are connected to a switch and all Internet request will be sent to proxy server. Either DHCP or static ip can be used.

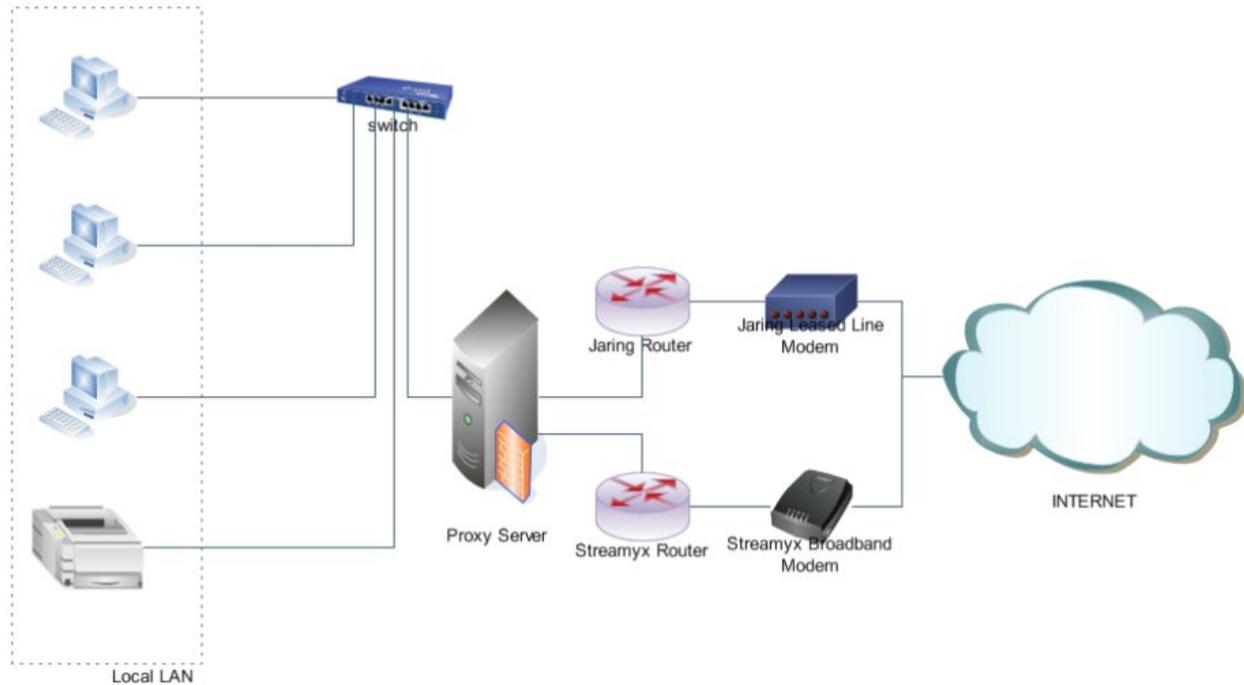
- Server

Installed with Linux operating system. Application being used as mention in the objective. Require 3 network cards. 1 for local LAN and 2 for Internet connection. The server also being use to filter all the request from the client to Internet.

- Internet Connection

2 Internet connection being used to achieved 99% Internet connectivity, fulfilling the needs for weather data transmission.

Infrastructure workflow.



Usage Model

The infrastructure was developed to suit the needs for the Regional Meteorological Offices. All the clients will connect through the same gateway, where by the gateway filter all the request accordingly and connect it to the Internet. The Internet connection part is handled by the proxy server by schedule check the status of the Internet connectivity.

System Overview

From the diagram above, it can be details about the server that consists of:

- Fedora Core 5 Linux
- Shorewall application
- Squid application
- Dansguardian application

Reasons for using OSS

OSS was chosen because it provided a low cost development platform and also the security configuration can be customized according to the needs required.

How OSS provided solutions for agency needs

The headquarters has already implement the OSS proxy server and the needs to fulfill the Regional Meteorological Offices needs, the same solution has been adopt and few changes being made. Because of its open source matters and no licensing issues, this project can being done without any major problem.

Innovations

To try to fulfill the needs for LAN configuration and 99% interruptible Internet connectivity.

Impact

As a result of the deployment of of this solution, Regional Meteorological Offices already has the access to the main internal meteorological application at head quarters and all weather activities can be done without any interruption.

Learning experiences

Key experienced, problems regarding Internet connectivity problem can be minimized as the client only knows that they are connected, not how they are connected.

Current Project Status

The project is currently in used by 6 Regional Meteorological Offices nationwide. Hopefully the same solution can be adopt in the Auxiliary Weather Station that used streamyx broadband, dial-up jaring and RAS.

Testimonials

Because of the implementation only being done within the department, it can only be testify by the Computer Division of the department. From the end users part, they are very happy with the non-disruption of Internet connectivity although they are not actually know the background process of it.

Other relevant information

Some configuration settings for the application being used

Shorewall

Act as the Netfilter configurator. By default all access are denied through the policy definition. Only access from LAN to the Proxy Server and access from Proxy Server to Internet are allowed. Customized access are set in the rules section.

One example of user request is for Internet access using port 80. User request for port 80 will transparently diverted to port 8888, that is the dansguardian web filtering port. Dansguardian will then make the request to Squid cache server on port 3128.

Internet provider related, Jaring and Streamyx and set in the provider section with the value needed. The traffic

shaping that functioning as the route setting for the Internet access are set in the tcrules section.

If any access need to be done from Internet to any machine in the local LAN, static NAT can be configure to map public ip address to the private local LAN ip address.

Squid

Used as the web cache for faster access. Set to be run on port 3128. Set to be transparent so that no additional configuration need to be set in client Internet browser.

Dansguardian

Used as the web filtering application. Set to be run on port 8888. Accept request that is originally diverted from client request on port 80. Block any access to unrelated website such as porno, gambling and others. Also block users from downloading executable or malicious program from Internet.

Cronjob

A scheduled task has been set up to monitor the status of the Internet line being used in a period of every 10 minutes. If any of the line has problem, all access will be diverted to the available Internet line.

FTP Service

The proxy server also act as the local LAN FTP server. Any related files for example printer drivers, Adobe Reader application has been put in the server so that all the client can access an used it. Only access from local LAN are allowed.

Relevant URLs

Fedora Linux

<http://fedoraproject.org/>

Shorewall

<http://www.shorewall.net/>

Squid

<http://www.squid-cache.org/>

Dansguardian

<http://dansguardian.org/>