# ALEPH OBJECTS®
## INCORPORATED

## FIREWALL

Aleph Objects Firewall

by Aleph Objects, Inc.



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# Introduction

# Firewall

Aleph Objects' HQ uses an OpenBSD router to connect to the Internet. We would like to upgrade it, using the best free software solutions.

Firewall

Stop.

## 1.1 Overview

Firewall.

- Must be free software.
- The project must still be alive.
- Does it use a hardened kernel?
- How does it do security updates?
- Are there open security issues?
- Are there any CVEs?
- How are security issues handled?
- Is there a list of security issues?
- Does it have a wifi portal? (Should that be a separate box or in OpenWRT?)
- Does upstream https actually work?
- UTM - Unified Threat Management (e.g. snort, etc.)
- Load balancing between multiple upstreams (without BGP).
- Load balancing between dual local routers.
- Fail over to standby router (e.g. pfsync).
- "Anti-virus", SMTP, POP scans? Meh? (e.g. OpenBSD has greylist/tarpit.)
- Packet cleansing (e.g. tcp header randomization).
- Do we want DNS, DHCP, etc? Probably not?
- OpenVPN (built into router, or thru it?).
- Network graphing (MRTG, aguri, etc.)
- No broken "community" editions.

- Have mirrored server doing analysis?
- NAT options? cone, etc.
- Local system monitoring (e.g. system temp, hdd status, etc.)
- sshd
- GSM, pppd ?
- Two-factor authentication.

# Authentication

# Who?

## 2.1 Overview

Two-factor authentication using TOTP.

# Routers

# There.

## 3.1 Overview

Routers.

# Analytics

# Wha?

## 4.1 Overview

What is the network doing?

- snort
- MRTG
- Aguri

# Hardware

# Purchase Order

## 5.1 Overview

Hardware.

- (8) 1 gig ethernet ports Connects to (1) 100M ethernet upstream fiber optic Connects to (1) 100M ethernet upstream wifi Various LAN
- (Hot swap?) Dual Power Supplies
- (How swap?) RAID (Linux md), with SSD storage.
- 2.5” drive bays
- Total 8GHz CPU
- 8-16 gigs RAM ? Depends on OS.
- Two servers total, for standby/failover

Switches

Here.

## 6.1 Overview

There are now many new free software solutions for network switches. Unfortunately, they are all high-end data center gear, the least expensive costing over $3,000USD.

## 6.2 Open Compute Project

http://www.opencompute.org/ http://github.com/opencomputeproject

Project so massive data centers can be more ”open” and interoperate better between vendors, by using free software.

## 6.3 ONIE

onie.org Open Network Install Environment. Used to install an OS to a switch. Comes pre-installed from switch manufacturer.

## 6.4 Open Network Linux

opennetlinux.org Distro for bare metal switches.

- BIRD – http://bird.network.cz/
- Quagga – http://www.quagga.net/
- OpenNSL – Broadcom chipsets. Accton. Github archive has proprietary license (LICENSE-Adv = non-free).
- OF-DPA – From Broadcom.
- SAI
- FBOSS
- Azure SONiC
- FlexSwitch – OpenSnaproute – Snaproute

# OS

# Free Operating Systems

There are a lot of operating systems to consider...

## 7.1 Debian

Debian

We use Debian for nearly everything else. It could easily be used as a router/firewall. There are better, more tuned options.

## 7.2 OpenBSD

OpenBSD

We are using OpenBSD right now for our firewall. It is very reliable and secure. Few people know how to administer it. It is all command line editing of firewall configuration files. We are potentially switching away from it to get something easier to use and that has more analytics.

## 7.3 Gentoo

Gentoo

Can be tuned in.

## 7.4 FreeBSD

FreeBSD

Solid OS. Can use OpenBSD's pf, iirc. Same problem as with OpenBSD, few admins know it.

## 7.5 NetBSD

NetBSD

Solid OS. Can use OpenBSD's pf, iirc. Same problem as with OpenBSD, few admins know it.

## 7.6 Alpine Linux

Alpine — "Small. Simple. Secure. Alpine Linux is a security-oriented, lightweight Linux distribution based on musl libc and busybox."

Download and install .iso to USB. Boot from USB, do text install onto HD. The installer looked very much like OpenBSD and was quite terse, but worked fine. The installed system is a basic lean GNU/Linux installation. Firewall configuration is text based. Looks nice, but not many features, except lightweight. Similar to OpenWRT in that way, except no web GUI, AFAICT.

## 7.7 clearOS

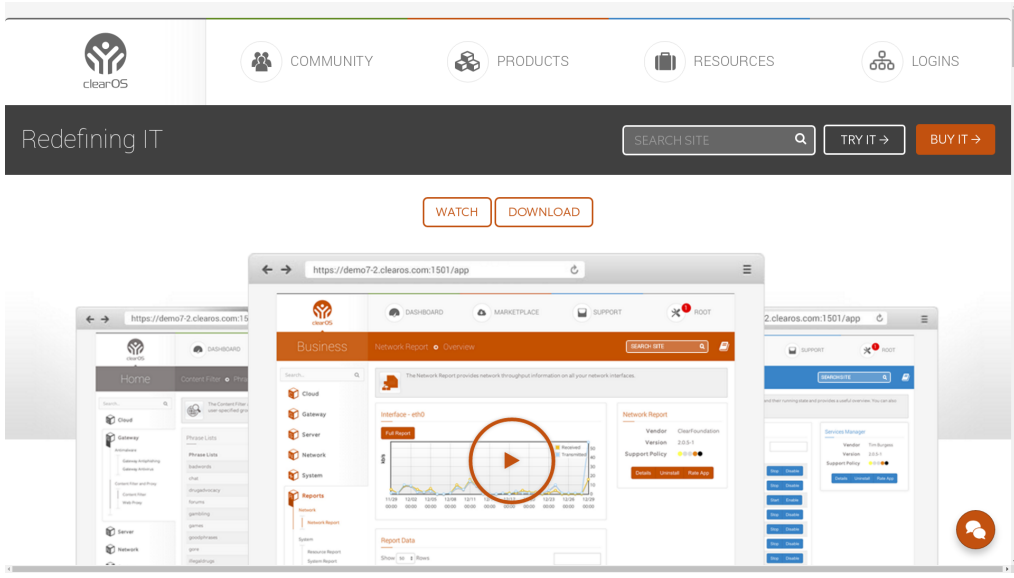


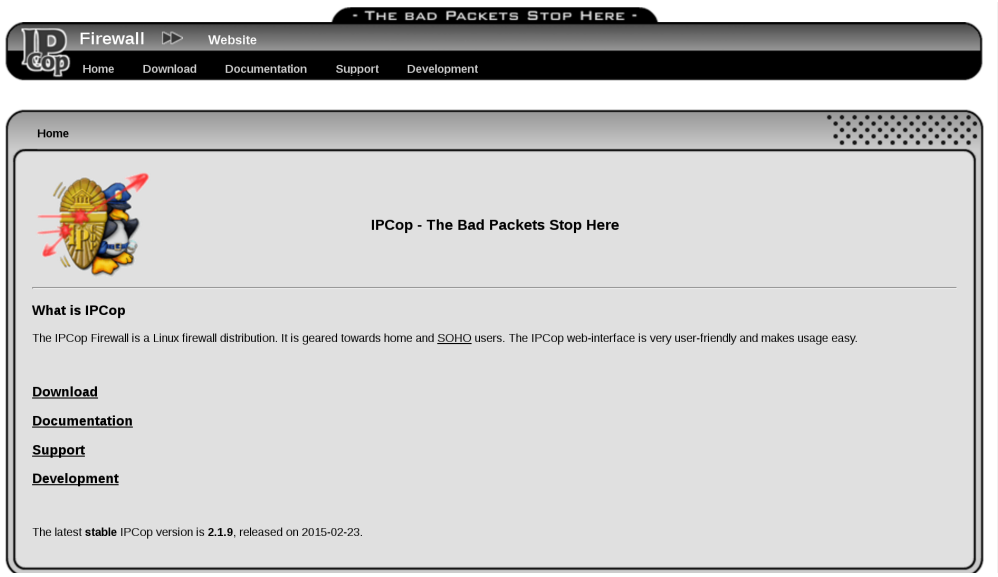

Figure 7.1: clearOS Website

clearOS — "ClearOS is an operating system for your Server, Network, and Gateway systems. It is designed for homes, small to medium businesses, and distributed environments. ClearOS is commonly known as the Next Generation Small Business Server, while including indispensable Gateway and Networking functionality. It delivers a powerful IT solution with an elegant user interface that is completely web-based."

- Overall, very very nice, very clean with many features.
- Baitware is the only thing holding this back.
- The web interface never crashed or caused issues.
- Usage is stable.
- Latest release: 7.2.0
- Release Date: March 7, 2015.
- Package Updater: yum
- Base OS: Fedora? CentOS?
- Easy GUI install
- Has enterprise (baitware?) version.
- Has enterprise hardware.
- Web based configuration system started on first boot
- Web wizard has option to select Community or non-free versions.
- Web wizard has system registration for a marketplace for apps. Have to register?
- Registering set "Software End-of-Life" to August 31, 2018.
- Lots of phone-home activity with marketplace and registration....
- Simple "Update All" button to update system (with yum, afaict).
- Very clean, overall.
- Wide variety of "Apps" in the Marketplace that are GPL.
- Non-free plugins are listed along free ones. The owncloud plugin is non-free.
- Most apps don't have any ratings,

- The default “Exception Sites” whitelist had their clear*.com sites and a few *.microsoft.com.
- Has optionally transparent web proxy.
- Installed many Apps, and it was all very clean.
- clearOS gets pwned, we get pwnd? Yes.
- Need to create account to get to knowledge base ?
- Actual firewalling rules (e.g. block just these devices from everything but port 443) aren’t so strong.
- There doesn’t appear to be a way to say “just allow port 22 from NNN”...
- A lot of great setup.
- MultiWAN — Nice, but simple load balancing between multiple upstreams.
- No fail over to another router (ala CARP).
- dhclient (?) overwrites DNS addresses, no place to set static (?!?)

## 7.8 IPCop




IPCop — "The IPCop Firewall is a Linux firewall distribution. It is geared towards home and SOHO users. The IPCop web-interface is very user-friendly and makes usage easy."

- Last release was 2015-02-23, well over a year ago.
- The i486 image doesn't boot all the way, gives video artifacts.
- All looks pretty old and crufty at this point.

## 7.9 IPFire


IPFire — "the professional and hardened Linux firewall distribution that is secure, easy to operate and coming with great functionality so that it is ready for enterprises, authorities, and anybody else."

- `http://downloads.ipfire.org/releases/ipfire-2.x/2.19-core103/ipfire-2.19.x86_64-full-core103.iso`

## 7.10 OPNsense

OPNsense — "the Open Source Firewall that is easy-to-use and protects your network"

## 7.11 pfSense

pfSense — "free, open source customized distribution of FreeBSD specifically tailored for use as a firewall and router that is entirely managed via web interface."

# Contact

## Phone, Email, Web, Location

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# Colophon

Created with 100% Free Software

Debian GNU/Linux

LaTeX Memoir